Appendix A. Financial and Administrative Closeout

Workplan Outputs

The Groundwater Branch has committed to the following outputs:

- Identification of suitable groundwater monitoring sites in the Salt and Licking River basins
- Collection of samples from 30 sites quarterly for one year and delivering these samples to the laboratory for analysis for several parameters, including major inorganic ions, nutrients, pesticides, metals, volatile organic compounds and residues
- Data analysis, including data collected within these basins for other projects
- Production of a report summarizing all relevant groundwater data for this BMU
- Delivering hard-copies of the basin report to the River Basin Teams, local conservation districts, Natural Resource Conservation Service, Agricultural Water Quality Authority, Agricultural Extension offices and interested stakeholders
- Posting the report on the Division of Water's internet site

Budget Summary

- Total project budget is $88,000
- Budget has been expended in personnel costs approximately equivalent to 1.25 person years
- Groundwater Branch has managed the project, including:
    - ✓ researching background data
    - ✓ conducting on-site inspections to identify sampling sites
    - ✓ collecting groundwater samples
    - ✓ transporting samples to the laboratory
    - ✓ interpreting sample results
    - ✓ preparing maps and reports
    - ✓ providing reports to interested parties

- Time codes used for this project were:
    - ✓ Division for Environmental Services: A-38
    - ✓ DOW original time code: NACA131
    - ✓ DOW new time code:

ORG	2DOW
PBU	BA00
FUND	1200
ACT	MOAM
FUNCTION	B007
PROJECT	NPS9602Z

Budget Summary Table

Category	BMP Implementation	Management	Public Education	Monitoring	Technical Assistance	Other	Total
Personnel				$88,000			$88,000
Supplies							
Equip.							
Travel							
Contract							
Op. Costs							
Other							
Total				$88,000			$88,000

Detailed Budget Table

Budget Categories	Section 319(h)	Non-Federal Match	Total
Personnel	$55,000	$33,000	$88,000
Supplies	$	$	$
Equipment	$	$	$
Travel	$	$	$
Contractual	$	$	$
Operating Costs	$	$	$
Other	$	$	$
TOTAL	$55,000	$33,000	$88,000

Funds Expended

All funds for this project were expended using personnel dollars.

Equipment Summary

No equipment was purchased for this project.

Special Grant Conditions

No special grant conditions were placed on this project by the EPA.

Appendix B. Quality Assurance / Quality Control for Water Monitoring

1. Title Section

A. Project Name

Expanded Groundwater Monitoring for Nonpoint Source Pollution Assessment in the Salt and Licking River Basins

B. QA/QC Plan Preparers

James S. Webb, Geologist - Registered
David P. Leo, Geologist Supervisor - Registered

Kentucky Division of Water, Groundwater Branch
14 Reilly Road
Frankfort, Kentucky 40601

(502) 564-3410

C. Date

January 14, 1999

D. Project Description

The Kentucky Division of Water currently conducts quarterly nonpoint source groundwater monitoring at approximately 70 sites across the state. This project means to expand that monitoring effort in the Salt and Licking River basins (Kentucky Basin Management Unit Two) by increasing the number of monitoring sites and focusing additional efforts of the existing monitoring network in these watersheds. This project is intended to work in coordination with other members of the River Basin Teams who are conducting surface water and biological sampling.

The goal of this project is to identify the impacts of nonpoint source pollution on the groundwater in the Salt and Licking River basins. The objective of this study is to identify aquifers that have been impacted by nonpoint source pollution. Problems in these areas will be identified in order that future nonpoint source resources may be properly focused regarding nonpoint source pollution prevention and pollution abatement.

2. Project Organization and Responsibility

A. Key Personnel

James Webb, Geologist-Registered, Technical Services Section of the Kentucky Division of Water Groundwater Branch will coordinate this project. David P. Leo, Geologist Supervisor - Registered, Technical Services Section and Peter T. Goodmann, Manager, Groundwater Branch, will provide additional project oversight.

Gary O'Dell, Environmental Technologist Chief with the Data Management & Support Section of the Groundwater Branch will scout suitable sampling locations. O'Dell and other members of the Groundwater Branch and Kevin Francis, Hazard Regional Office, will assist in sampling and sample delivery. The Kentucky Department for Environmental Protection's Division of Environmental Services laboratory will be responsible for sample analysis. All data generated will be delivered to the Kentucky DEP Consolidated Groundwater Database and will be forwarded to the Kentucky Geological Survey's Groundwater Data Repository.

B. Laboratory

Division of Environmental Services
100 Sower Boulevard
Frankfort, Kentucky 40601

(502) 564-6120

C. Participating Agencies

This project will coordinate/cooperate with the Division of Water's Watershed Initiative, the Salt and Licking River Basin Teams and the Division of Water's Water Quality Branch.

3. Watershed Information

A. Stream Names

The Salt and Licking rivers and their tributaries. For purposes of this study, some Minor Ohio River Tributaries (MORT) adjacent to these basins have been included.

Numerous groundwater monitoring sites in these areas have been identified.

B. Major River Basin

Salt and Licking River basins.

Water Body Number

Salt River Basin:	21024402
Licking River Basin:	21015583

USGS Hydrologic Unit Number

Salt River Basin:	05140102
	05140103
Licking River Basin:	05100101
	05100102
Minor Ohio River Tribs:	05140101
	05140104

C. Stream Order

This project encompasses the entire Salt and Licking River basins.

D. Counties in Which Study Area is Located

Salt River Basin: Anderson, Boyle, Breckinridge, Bullitt, Carroll, Casey, Hardin, Jefferson, Larue, Marion, Meade, Mercer, Nelson, Oldham, Shelby, Spencer, Trimble.

Licking River Basin: Bath, Boone, Bourbon, Bracken, Campbell, Carroll, Fleming, Gallatin, Grant, Harrison, Kenton, Lewis, Mason, Menifee, Montgomery, Morgan, Nicholas, Pendleton, Robertson, Rowan.

4. Monitoring Objectives

Determine impacts of nonpoint source pollution on groundwater resources in selected areas of the Licking and Salt River basins.

Provide guidance for the nonpoint source program to focus future resources relating to nonpoint source pollution of groundwater.

Support other programs, such as the Wellhead Protection program, the Groundwater Protection Plan program, the Agriculture Water Quality Authority, etc.

Provide additional data useful for the long-term management of the resource.

5. Study Area Description

The Salt River Basin occurs mainly within the Outer Bluegrass Physiographic Region, which is underlain by thin-bedded Ordovician shale and limestone. The Salt River Basin extends into the Mississippian Plateau/Eastern Pennyroyal Physiographic Region, which is characterized by thick sequences of Mississippian limestone with well developed karst hydrology.

The Licking River rises in the Eastern Kentucky Coal Field Region, underlain by Pennsylvanian shale, sandstone, coal and siltstone. The middle reaches of the Licking River pass through the Outer Bluegrass Region and into the Inner Bluegrass Region, characterized by rolling topography and underlain by Ordovician limestone with some interbedded shale and moderately developed karst hydrology. The Licking River also passes through a narrow strip of the Mississippian Plateau Physiographic Province.

The minor Ohio River tributaries included in the Salt/Licking River Basin management unit primarily drain the Outer Bluegrass and thick alluvium along this major river.

6. Monitoring Program/Technical Design

A. Monitoring Approaches

Monitoring will begin in April 1999. Duplicate samples will be collected for at least 10% of all samples in order to check reproducibility and provide QA/QC.

Field reconnaissance will be conducted prior to groundwater sampling to assess the suitability and accessibility of each site. The appropriate Well Inspection or Spring Inventory records will be completed. Site locations will be plotted on 7.5-minute topographic maps and identified by a site name and unique identification number (AKGWA number) for incorporation into the Department for Environmental Protection's Consolidated Groundwater Data Base and the Kentucky Geological Survey's Groundwater Data Repository.

B. Monitoring Station Location Strategy

All monitoring station locations will be in addition to other stations currently sampled in the basin. All monitoring sites will be karst groundwater basin springs or karst windows, fracture springs, contact springs or water wells.

C. Sample Frequency and Duration

Monitoring will begin in April 1999 and samples will be collected quarterly through March 2000.

D. Sample Parameters, Containerization, Preservation and Handling

Consistent with other monitoring efforts, samples will be collected at each spring or well and samples analyzed for some or all of the following: major inorganic ions; nutrients; total organic carbon; pesticides, including the most commonly used herbicides, insecticides and fungicides; and dissolved and total metals. The list of parameters can be found on the attached Chain-of-Custody Form. The analytical methods, containers, volumes collected, preservation and sample transport will be consistent with the Division of Water's Standard Operating Procedures for Nonpoint Source Surface Water Quality Monitoring Projects, prepared by the Water Quality Branch (August, 2002).

Major inorganic ions are used to establish background groundwater chemistry and also to measure impacts from nonpoint source pollutants such as abandoned mine lands and abandoned oil and gas production operations by measuring pH, alkalinity, chloride, sulfate and fluoride. Nutrients and total organic carbon are used to measure impacts from agricultural operations (Ammonia, Nitrate, Nitrite, TKN and orthophosphate) and/or improper sewage disposal (nitrates, ammonia). Where sewage is suspected as a nonpoint source pollutant, unbleached cotton "bugs" may be used to detect optical brighteners (whitening agents used in laundry products and commonly found in sewage). Pesticides are measured to determine both rural agriculture and urban domestic- and commercial-use impacts on ground water. Metals are used to establish the rock-groundwater chemistry, establish local and regional backgrounds for metals and determine nonpoint source impacts from abandoned coal mine operations.

Bacteria is **not** a proposed sampling parameter because of logistic considerations. Sampling at numerous sites occurs over a one or two-day period, commonly in remote regions. Because of the short holding time for bacteria (6 hours for fecal coliform, 24 hours for total coliform) we are unable to sample efficiently and regularly collect bacteria samples and comply with the required holding times. Where bacteria is suspected to be a nonpoint source pollutant, bacteria samples may be collected or other sampling events may be scheduled. In addition, unbleached cotton "bugs" may be used to detect optical brighteners, common in domestic sewage, originating from laundry products.

All samples will be analyzed by the Division of Environmental Services laboratory according to the appropriate EPA water method.

7. Chain-of-Custody Procedures

Sample containers will be labeled with the site name and well or spring identification number, sample collection date and time, analysis requested, preservation method and collector's initials. Sampling personnel will complete a Chain-of-Custody Record, developed in conjunction with the DES laboratory, for each sample. The DES laboratory will be responsible for following approved laboratory QA/QC procedures, conducting analyses within the designated holding times, following EPA-approved analytical techniques and reporting analytical results to the Groundwater Branch.
A sample Chain-of-Custody Form is attached.

8. Quality Assurance/Quality Control Procedures

A. Decontamination Protocols

All sampling supplies that come into contact with the sample will be new, disposable equipment or will be decontaminated prior to and after each use, using the following protocols.

Sample Collection and Filtration Equipment

Whenever possible, sample collection is conducted using the sample container, except for dissolved metals, which are filtered on site. Sample collection equipment, such as bailers and buckets, will consist of Teflon. Pesticide samples will be collected using the sample container or a stainless steel bailer or bucket in order to avoid the problem of pesticide adsorption to the sampling device (as is considered to occur with Teflon instruments). Any reusable equipment will be decontaminated by rinsing with a 10% hydrochloric acid (HCL) solution, triple rinsed with deionized water and triple rinsed with water from the source to be sampled prior to collecting a sample. After sampling is complete, excess sample will be disposed of and the equipment will again be rinsed with the 10% HCL solution and triple rinsed with deionized water.

New 0.45 micron filters will be used at each sampling site. Any tubing that contacts the sample will also be new. Any reusable filter apparatus will be decontaminated in the same manner as sample collection equipment. Additionally, any intermediary collection vessel will be triple rinsed with filtrate prior to use.

Field Meters

Field meter probes will be rinsed with deionized water prior to and after each use.

B. Equipment Calibration

Field meters will be calibrated in accordance with the manufacturer’s instructions.

C. Sample Collection and Preservation/Contamination Prevention

Water samples will be fresh groundwater collected prior to any type of water treatment. Samples not requiring field filtration will be collected directly in the sampling container. Samples requiring field filtration will be collected in a Teflon bucket decontaminated in

accordance with decontamination protocols for sample collection and filtration equipment, filtered and transferred to the appropriate container. Pesticide samples will be collected using the sample container or a stainless steel bailer or bucket wherever necessary.

Sample containers will be obtained from approved vendors and will be new or laboratory-decontaminated in accordance with Division of Environmental Services accepted procedures. Sample containerization, preservation and holding time requirements are outlined in the Division of Water's Standard Operating Procedures for Nonpoint Source Surface Water Quality Monitoring Projects, prepared by the Water Quality Branch (August, 2002). Necessary preservatives will be added in the field; preservatives for dissolved constituents will be added after field filtration. Samples will be stored in coolers packed with ice for transport to the Division of Environmental Services laboratory.

Sample containers will be labeled with the site name and identification number, sample collection date and time, analysis requested, preservation method and collector's initials. Sampling personnel will complete a Chain-of-Custody Record for each sample. The Division of Environmental Services laboratory will be responsible for following approved laboratory QA/QC procedures, conducting analyses within the designated holding times, following EPA-approved analytical techniques and reporting analytical results to the Groundwater Branch. Wells will be purged properly prior to sampling.

Samples will be collected as close to the spring resurgence as possible. If inhospitable terrain prohibits spring access, a decontaminated Teflon bucket attached to a new polypropylene rope may be lowered to the spring to collect the sample. Samples for pesticide analysis will be collected using a stainless steel bucket.

Duplicates and Blanks

Duplicate samples will be collected for at least 10% of all samples in order to check reproducibility and provide QA/QC control. At least one duplicate sample will be submitted with each batch of samples, regardless of the number of samples in the batch. Blanks of deionized water will be submitted at least once per quarter. Blanks will be collected, filtered and preserved in the same manner as a sample.

Field Measurements

Conductivity, temperature and pH will be measured in the field at each site using portable automatic temperature compensating meters and recorded in a field log book. Meters will be calibrated according to the manufacturer's specifications, using standard buffer solutions. Meter probes will be decontaminated according to decontamination protocols for field meters and stored according to the manufacturer's recommendations.

CHAIN OF CUSTODY RECORD
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DIVISION OF WATER - GROUNDWATER BRANCH - NPS Salt/Licking River Basin Project - Funding Source A-40

Site Identification	**Collection Date/Time**	**Field Measurements**
Location:	Date: _____	Temp: _____ ºC
County:	Time: _____	pH: _____
AKGWA #:		Cond: _____ umhos

Sampler ID: _____

Division for Environmental Services Samples

Analysis Requested	**Container Size, Type**	**Preservation Method**	**Parameters**	**Analysis Requested**	**Container Size, Type**	**Preservation Method**	**Parameters**
	1000 ml Plastic	Cool to 4ºC	**Bulk Parameters** **IC Scan** (includes Chloride, Fluoride, Nitrate-N, Nitrite-N, Sulfate, Ortho-P), **Alkalinity, Conductivity, pH, TSS, TDS**		1000 ml Plastic	Filtered HNO_3 Cool to 4ºC	**Dissolved Metals by ICP** plus Arsenic, Lead, Mercury, Selenium
	1000 ml Plastic	H_2SO_4 Cool to 4ºC	**NH_3/TKN/TOC** **Total P**		1000 ml Plastic	HNO_3 Cool to 4ºC	**Total Metals by ICP** plus Arsenic, Lead, Mercury, Selenium
					1000 ml Glass	Cool to 4ºC	**N/P Pesticides** Method 507
					1000 ml Glass	Cool to 4ºC	**Pesticides/PCBs** Method 508
					1000 ml Glass	Cool to 4ºC	**Herbicides** Method 515.1

Signatures:

Relinquished by: _____ Date: _____ Time: _____

Received by: _____

Relinquished by: _____ Date: _____ Time: _____

Received by: _____

Sample #: _____ Report #: _____

Appendix C. Groundwater Sites Monitored in BMU 2

COUNTY	SITE NUMBER	SITE NAME	PHYSIOGRAPHIC REGION	7.5 QUADRANGLE	TYPE	LATITUDE	LONGITUDE
Anderson	90002176	Hanks Spring	Bluegrass	Lawrenceburg	Unused Spring	38.0264	-84.9416
Bath	90002118	Hawk Spring	Bluegrass	Preston	Unused Spring	38.0433	-83.7972
Boone	00021106	Ammons Well	Ohio River Alluvium	Hooven	Irrigation Well	39.1314	-84.7641
Boone	00021576	Brueggemann Well	Bluegrass	Burlington	Private Well	39.0313	-84.6791
Boone	00030318	Potters Ranch Well	Bluegrass	Rising Sun	PWS Well	38.9188	-84.8027
Boone	00049450	Arrasmith Well	Bluegrass	Rising Sun	Private Well	38.9256	-84.7956
Bourbon	00048654	Wasson Well	Bluegrass	Paris W	Private Well	38.2022	-84.3225
Bourbon	90001678	Silver Spring	Bluegrass	Paris W	Unused Spring	38.2422	-84.3088
Bourbon	90001921	Lehman Spring	Bluegrass	North Middletown	Unused Spring	38.1467	-84.0986
Boyle	90002169	Mayes Spring	Bluegrass	Parksville	Unused Spring	37.6186	-84.9269
Bracken	00039375	Augusta Well 1	Ohio River Alluvium	Felicity	PWS Well	38.7722	-84.0086
Bracken	00042674	Augusta Well	Ohio River Alluvium	Felicity	PWS Well	38.7728	-84.0183
Bracken	00051635	Augusta Well 2	Ohio River Alluvium	Felicity	PWS Well	38.7730	-84.0175
Breckinridge	90001027	Fiddle Spring	Miss. Plateau	Garfield	Unused Spring	37.8131	-86.2919
Breckinridge	90001031	Big Spring	Miss. Plateau	Big Spring	Unused Spring	37.7988	-86.1516
Bullitt	00005572	Dezarn Well	Miss. Plateau	Shepherdsville	Private Well	37.9755	-85.6550
Bullitt	00025235	Hileman Well	Miss. Plateau	Brooks	Private Well	38.0694	-85.7083
Bullitt	00029676	Flowers Well	Miss. Plateau	Brooks	Private Well	38.0633	-85.7061
Campbell	90002112	Strickmeyer Spring	Bluegrass	New Richmond	Private Spring	38.9511	-84.3327
Carroll	00007131	Carroll Co. Well 3	Ohio River Alluvium	Vevay S	PWS Well	38.7377	-85.0600
Carroll	00007132	Carroll Co. Well 4	Ohio River Alluvium	Vevay S	PWS Well	38.7377	-85.0600
Carroll	00007133	Carroll Co. Well 5	Ohio River Alluvium	Vevay S	PWS Well	38.7377	-85.0600
Carroll	00007134	Carroll Co. Well 6	Ohio River Alluvium	Vevay S	PWS Well	38.7377	-85.0600
Casey	90002091	Michael Spring	Bluegrass	Bradfordsville NE	Unused Spring	37.4747	-85.0369
Fleming	90002093	Crain Spring	Bluegrass	Flemingsburg	Unused Spring	38.4311	-83.7452
Fleming	90002096	Belle Grove Spring	Bluegrass	Plummers Landing	Unused Spring	38.3164	-83.5380
Fleming	90002183	Ewing Spring	Bluegrass	Elizaville	Unused Spring	38.4267	-83.8705
Gallatin	00037376	Warsaw Well	Ohio River Alluvium	Florence	PWS Well	38.7825	-84.9016
Gallatin	00037377	Warsaw Well	Ohio River Alluvium	Florence	PWS Well	38.7825	-84.9016
Harrison	90002135	Bills Spring	Bluegrass	Shady Nook	Unused Spring	38.4792	-84.2277
Jefferson	00039351	Louisville Well	Ohio River Alluvium	Jeffersonville	PWS Well	38.2808	-85.7008
Jefferson	90001131	Forrest Hills Spring	Bluegrass	Jeffersontown	Unused Spring	38.2161	-85.5891
Jefferson	90001138	Farmington Spring	Bluegrass	Louisville E	Unused Spring	38.2147	-85.0025
Jefferson	90002175	Jesse's Spring	Bluegrass	Louisville E	Unused Spring	38.2461	-85.6713
Lewis	00014277	Vanceburg Well 3	Ohio River Alluvium	Vanceburg	PWS Well	38.6063	-83.2613
Lewis	00014293	Vanceburg Well 4	Ohio River Alluvium	Vanceburg	PWS Well	38.6066	-83.2661
Lewis	90002137	Cameron Spring	Miss. Plateau	Buena Vista	Private Spring	38.6350	-83.3650
Magoffin	00051638	Wireman Well	E. Coal Field	David	Private Well	37.5914	-82.9211
Marion	90002089	Turpin Spring	Bluegrass	Lebanon E	Private Spring	37.5606	-85.1292
Mason	00039353	W. Mason Well	Ohio River Alluvium	Higginsport	PWS Well	38.7572	83.8819
Mason	00044596	W.L.-Rectorville Well	Ohio River Alluvium	Maysville E	PWS Well	38.6381	-83.7169
Meade	00015022	Flaherty Well	Miss. Plateau	Flaherty	PWS Well	37.8336	-86.0638
Meade	00032211	Begley Well	Miss. Plateau	Guston	Private Well	37.8850	-86.1572
Meade	00047171	Meade Co. WD Well 3	Miss. Plateau	Flaherty	PWS Well	37.8363	-86.0658
Meade	90001063	Head of Wolf Cr. Spring	Miss. Plateau	New Amsterdam	Unused Spring	38.0661	-86.3594
Meade	90001824	Buttermilk Falls	Miss. Plateau	Mauckport	Unused Spring	38.0022	-86.1580
Meade	90002151	Morgan Cave Spring	Miss. Plateau	Rock Haven	Unused Spring	37.9503	-86.0558
Meade	90002179	Mallard Cave Spring	Miss. Plateau	Vine Grove	Unused Spring	37.7894	-85.9897
Menifee	90001136	Ezel Spring	E. Coal Field	Ezel	Unreg. Public Spring	37.9905	-83.4888
Menifee	90002147	Prater Cave Spring	Miss. Plateau	Scranton	Unused Spring	37.9328	-83.5594
Mercer	90000527	Humane Spring	Bluegrass	Harrodsburg	Unused Spring	37.7750	-84.8602
Mercer	90000582	Baker Spring	Bluegrass	Danville	Private Spring	37.7203	-84.8580
Montgomery	90000895	Roy's Spring	Bluegrass	Preston	Unused Spring	38.0122	-83.8200
Montgomery	90001147	Cunningham Spring	Bluegrass	Preston	Unused Spring	38.0136	-83.8208
Montgomery	90002115	Burden Spring	Bluegrass	Mount Sterling	Unused Spring	38.0381	-83.9713
Morgan	90002159	Bathtub Spring	E. Coal Field	West Liberty	Private Spring	37.9064	-83.3638
Morgan	90002161	Okley Spring	E. Coal Field	Wrigley	Unused Spring	38.0558	-83.3247

COUNTY	SITE NUMBER	SITE NAME	PHYSIOGRAPHIC REGION	7.5 QUADRANGLE	TYPE	LATITUDE	LONGITUDE
Nelson	00040416	Smith Well	Bluegrass	Bardstown	Private Well	37.7641	-85.3822
Nelson	90001003	Jutz Spring	Bluegrass	Cravens	Private Spring	37.7822	-85.5133
Nelson	90001551	Samuels Spring	Bluegrass	Samuels	PWS Spring	37.9039	-85.5580
Nelson	90002106	Hicks Spring	Bluegrass	Bardstown	Private Spring	37.7667	-85.4611
Oldham	90002170	Cat Spring	Bluegrass	La Grange	Unused Spring	38.4061	-85.3800
Robertson	90002110	Brumagen Spring	Bluegrass	Piqua	Unused Spring	38.4547	-84.0277
Rowan	90001151	Sheltowee Spring	E. Coal Field	Haldeman	Unused Spring	38.1463	-83.2913
Rowan	90001158	Austin Spring	E. Coal Field	Haldeman	Unused Spring	38.1438	-83.2897
Rowan	90002122	McKenzie Spring	Miss. Plateau	Bangor	Private Spring	38.0617	-83.4333
Rowan	90002123	Andy White Spring	Miss. Plateau	Haldeman	Unreg. Public Spring	38.1967	-83.2938
Shelby	90002102	Test Spring	Bluegrass	Simpsonville	Unused Spring	38.1469	-85.3163
Spencer	90002166	Foreman Spring	Bluegrass	Waterford	Unused Spring	38.0036	-85.4236
Washington	90002127	Shewmaker Spring	Bluegrass	Springfield	Unused Spring	37.7494	-85.1600

Table C-1 Groundwater Sites Monitored in BMU2

Appendix D. Reference Sites and Summary Statistics

COUNTY	SITE NUMBER	SITE NAME	PHYSIOGRAPHIC REGION	7.5 QUADRANGLE	TYPE	LATITUDE	LONGITUDE
Lewis	90002137	Cameron Spring	Miss. Plateau	Buena Vista	Private Spring	38.6350	-83.3650
Rockcastle	90001020	Fred Mullin Spring	Miss. Plateau	Johnetta	Unreg. Public Access	37.4533	-84.2361
Powell	90001134	Nada Spring	Miss. Plateau	Slade	Unreg. Public Access	37.8164	-83.6878

Table D-1 Reference Sites for Kentucky

NPS REFERENCE SITES SUMMARY STATISTICS							
	START DATE	END DATE	NUMBER OF SAMPLES	MEDIAN	MIN	MAX	RANGE
Conductivity	04/27/95	10/04/00	48	111.25	46.0	448.0	402.0
Hardness	07/14/95	12/03/01	28	52.3015	14.039	140.29	126.251
pH	04/27/95	10/04/00	44	7.31	6.01	8.12	2.11
Chloride	04/27/95	03/07/00	19	1.9	0.6	16.7	16.1
Fluoride	04/27/95	03/07/00	33	0.05	< 0.023	0.253	*0.230*
Sulfate	04/27/95	03/07/00	36	7.425	< 5.0	69.4	*64.4*
Arsenic	06/03/98	12/03/01	34	0.002	< 0.002	0.0045	*0.0025*
Barium	06/03/98	12/03/01	34	0.0305	0.0040	0.073	0.069
Iron	07/14/95	12/03/01	34	0.056	< 0.001	0.337	*0.336*
Manganese	06/03/98	12/03/01	34	0.0035	< 0.001	0.208	*0.207*
Mercury	06/03/98	12/03/01	34	0.00005	< 0.00005	< 0.00005	-
Ammonia	04/27/95	10/04/00	42	0.02	< 0.02	0.11	*0.09*
Nitrate	04/27/95	03/07/00	36	0.1805	< 0.01	0.888	*0.878*
Nitrite	04/27/95	03/07/00	21	0.005	< 0.002	0.006	*0.004*
Orthophosphate	04/27/95	10/04/00	43	0.011	< 0.003	0.069	*0.066*
Total Phosphorus	04/27/95	03/07/00	19	0.019	< 0.005	0.019	*0.014*
Alachlor	04/27/95	12/03/01	55	0.00004	< 0.00002	< 0.00006	-
Atrazine	04/27/95	12/03/01	55	0.00004	< 0.00004	< 0.0003	-
Cyanazine	05/03/95	12/03/01	48	0.00004	< 0.00004	< 0.0001	-
Metolachlor	04/27/95	12/03/01	55	0.00004	< 0.00004	< 0.0002	-
Simazine	04/27/95	12/03/01	52	0.00004	< 0.00004	< 0.0003	-
Total Dissolved Solids	04/27/95	10/04/00	48	63.0	< 10.0	266.0	*256.0*
Total Suspended Solids	04/27/95	10/04/00	48	3.0	< 1.0	13.0	*12.0*
Benzene	04/12/00	12/03/01	20	< 0.0005	< 0.0005	< 0.0005	-
Ethylbenzene	04/12/00	12/03/01	20	< 0.0005	< 0.0005	< 0.0005	-
Toluene	04/12/00	12/03/01	20	< 0.0005	< 0.0005	< 0.0005	-
Xylenes	04/12/00	12/03/01	20	< 0.0005	< 0.0005	< 0.0005	-
MTBE	04/12/00	12/03/01	20	< 0.001	< 0.001	< 0.001	-

Table D-2 Reference Sites, Summary Statistics

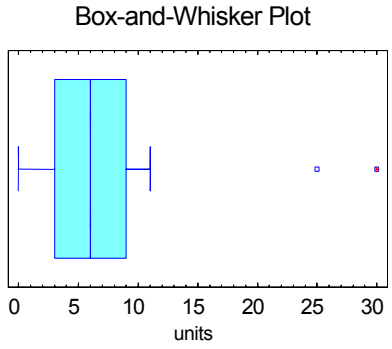
Appendix E. Constructing a Boxplot

Boxplots are useful to graphically depict the central location (point about which data points in a set will cluster) and the scatter or dispersion of the observations in a data set. This will better convey statistically significant information about a data set to a reader.

To construct a boxplot, first determine the quartiles Q_1, Q_2 (median) and Q_3.

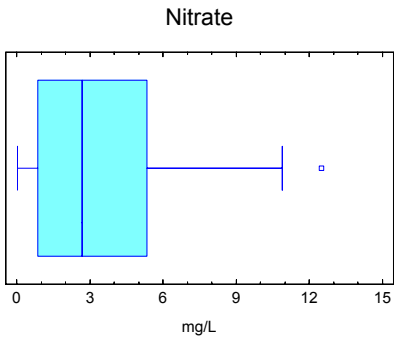
Q_1:	25^{th} quartile	25% of the data lies below and 75% of the data lies above this point
Q_2:	(median)	50% of the data lies below and 50% of the data lies above this point
Q_3:	75^{th} quartile	75% of the data lies below and 25% of the data lies above this point
IQR:	inter-quartile range	$Q_3 - Q_1$ (the center 50% of the data will lie within this range)

The box is then plotted as shown below:



In this example, $Q_3 = 9$ and $Q_1 = 3$, so the IQR = 6. You will note that the rectangular part of the boxplot extends for 6 units. The minimum sample point is 0 units and the maximum is 30 units, so the range of this data set is 30 units. The lines extending from the box are called "whiskers." The upper and lower boundaries for the whiskers are $Q_3 + 1.5$ IQR and $Q_1 - 1.5$ IQR, respectively. These boundary areas are called fences, but are not actually drawn in a boxplot. Vertical lines appear at the end of each whisker. These lines represent the smallest value within the lower fence area and the largest value within the upper fence area. Note the presence of two outliers: one at 25 units and one at 30 units. Outliers are observations more than 1.5 IQR from the quartiles, denoted by an open square. Extreme outliers, observations that lie greater than 3.0 IQR from the quartiles, are denoted by an open square overlain by a red cross.

Outliers are significant because they represent distinct deviations from the bulk of the data points in a set. In water quality data, values are generally skewed to the right, or positively skewed, due to the presence of a few high outliers. Most of the values in this type of data set cluster at or near 0, or some laboratory-defined detection limit. An example of this type of data is shown below:



The nitrate data range from 0.02 mg/L to 12.5 mg/L. The lower and upper quartiles are 0.859 mg/L and 5.330 mg/L, respectively, resulting in an IQR of 4.471 mg/L. Note the 12.5 mg/L is an outlier, as it is greater than 6.7065 mg/L above the upper quartile (1.5 * 4.471 = 6.7065).

Source: Brosius, 2001

Appendix F. Summarized and Graphical Representations of Study Data

BMU2: HYDROPARAMETERS SUMMARY STATISTICS						
	pH					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**3.51**	**8.37**	**7.51**	**7.48**
BLUEGRASS (INNER & OUTER):	04/26/95	09/27/00	6.37	8.32	7.51	7.61
MISSISSIPPIAN PLATEAU:	04/26/95	10/11/00	6.60	8.37	7.66	7.66
EASTERN COAL FIELD:	05/08/95	05/30/00	3.51	8.18	7.66	7.44
OHIO RIVER ALLUVIUM:	04/26/95	10/04/00	3.51	8.11	7.43	7.48
	CONDUCTIVITY					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**54.20**	**2620.00**	**578.00**	**693.00**
BLUEGRASS (INNER & OUTER):	04/26/95	09/27/00	130.00	2620.00	612.50	578.00
MISSISSIPPIAN PLATEAU:	04/26/95	10/11/00	76.60	606.00	412.00	-
EASTERN COAL FIELD:	05/08/95	05/30/00	86.60	867.00	205.00	-
OHIO RIVER ALLUVIUM:	04/26/95	10/04/00	86.60	919.00	677.50	418.00
	HARDNESS					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**03/03/97**	**12/12/01**	**17.36**	**986.60**	**278.67**	**-**
BLUEGRASS (INNER & OUTER):	03/03/97	12/12/01	46.69	986.60	307.92	-
MISSISSIPPIAN PLATEAU:	05/20/98	11/07/01	17.36	549.08	195.30	-
EASTERN COAL FIELD:	03/10/98	05/30/00	23.98	173.64	83.46	-
OHIO RIVER ALLUVIUM:	02/10/98	10/03/01	23.98	476.46	355.26	-

Table F-1 Hydroparameters, Summary Statistics

BMU2: HYDROPARAMETERS SAMPLE SUMMARY				
		pH[1 2]	Conductivity	Hardness[3 4]
NUMBER OF SAMPLES	**TOTAL:**	309	314	227
BY REGION:	**BLUEGRASS (INNER & OUTER):**	132	132	109
	MISSISSIPPIAN PLATEAU:	57	59	49
	EASTERN COAL FIELD:	26	27	15
	OHIO RIVER ALLUVIUM:	94	96	54
NUMBER OF SITES	**TOTAL:**	65	65	56
BY REGION:	**BLUEGRASS (INNER & OUTER):**	31	31	28
	MISSISSIPPIAN PLATEAU:	13	13	11
	EASTERN COAL FIELD:	6	6	5
	OHIO RIVER ALLUVIUM:	15	15	12
[1]Sites with at least one pH measurement in these categories:		**< 6.5**	**6.5 - 8.5**	**> 8.5**
pH sites	**TOTAL:**	3	64	0
	BLUEGRASS (INNER & OUTER):	1	31	0
	MISSISSIPPIAN PLATEAU:	0	13	0
	EASTERN COAL FIELD:	2	5	0
	OHIO RIVER ALLUVIUM:	0	15	0
[2]pH Samples in each of these categories:		**< 6.5**	**6.5 - 8.5**	**> 8.5**
pH samples	**TOTAL:**	4	305	0
	BLUEGRASS (INNER & OUTER):	1	138	0
	MISSISSIPPIAN PLATEAU:	0	57	0
	EASTERN COAL FIELD:	3	23	0
	OHIO RIVER ALLUVIUM:	0	87	0
[3]Sites with at least one hardness measurement in these categories:		**SOFT < 17**	**MODERATE 17 - 120**	**HARD > 120**
Hardness	**TOTAL:**		11	50
	BLUEGRASS (INNER & OUTER):		1	27
	MISSISSIPPIAN PLATEAU:		4	9
	EASTERN COAL FIELD:		5	2
	OHIO RIVER ALLUVIUM:		1	12
[3]Hardness was calculated (as equivalent CaCO3 in mg/L) as Hardness = 2.5(mg/L Ca) + 4.1(mg/L)Mg		**SOFT < 17**	**MODERATE 17 - 120**	**HARD > 120**
Hardness	**TOTAL:**	0	27	200
	BLUEGRASS (INNER & OUTER):	0	1	108
	MISSISSIPPIAN PLATEAU:	0	13	36
	EASTERN COAL FIELD:	0	12	3
	OHIO RIVER ALLUVIUM:	0	1	53

Table F-2 Hydroparameters, Samples Summary

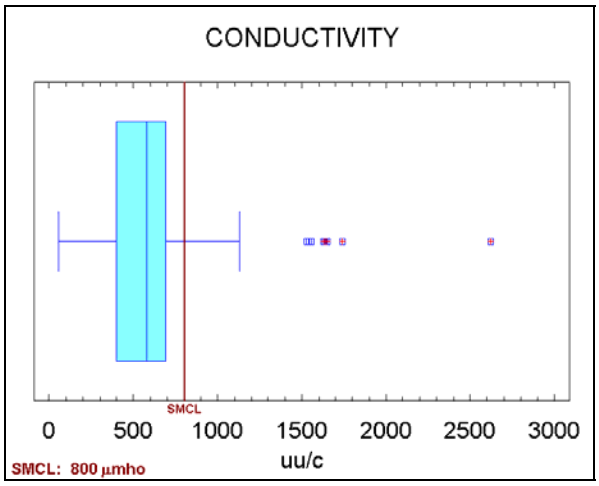


Figure F-3 Boxplot of conductivity measurements, BMU 2

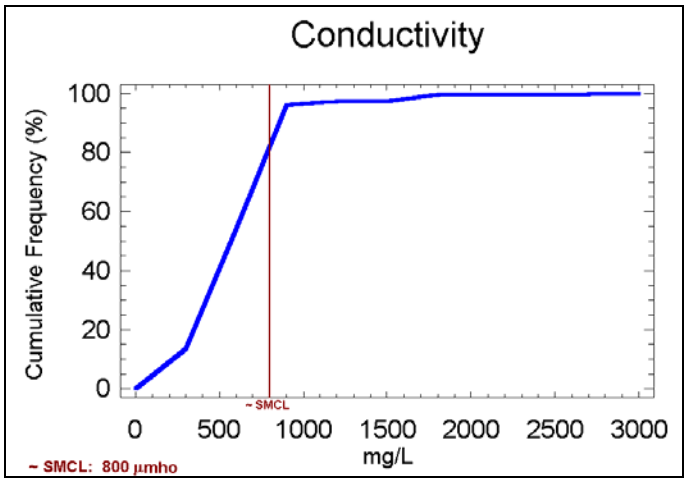


Figure F-4 Cumulative frequency curve for conductivity, BMU 2

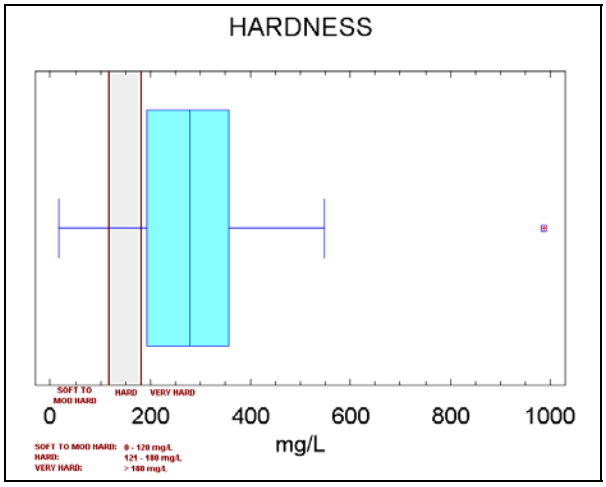


Figure F-5 Boxplot of hardness measurements, BMU 2

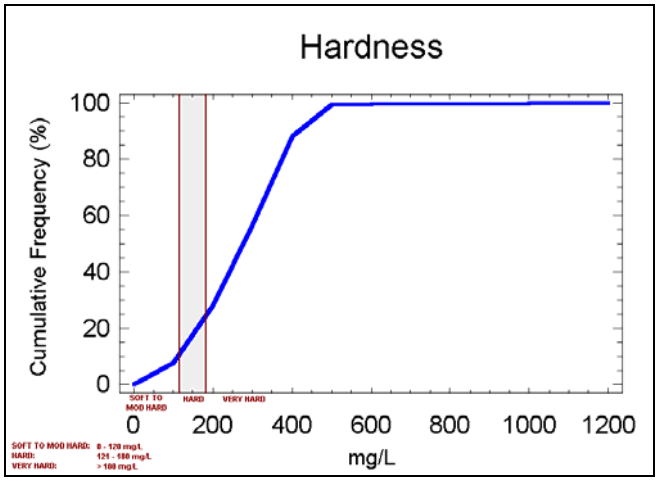


Figure F-6 Cumulative frequency curve for hardness, BMU 2

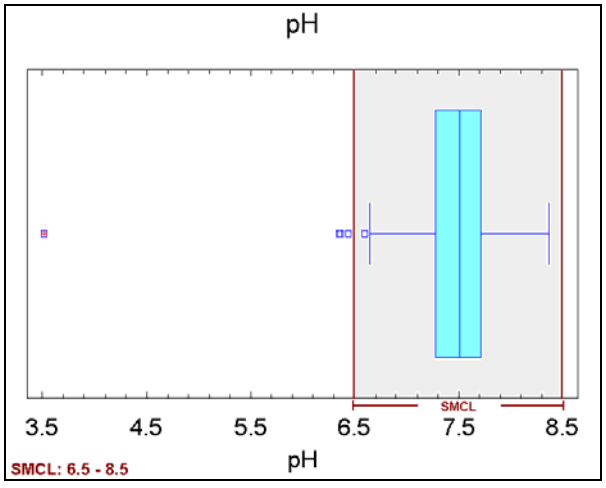


Figure F-7 Boxplot of pH measurements, BMU 2

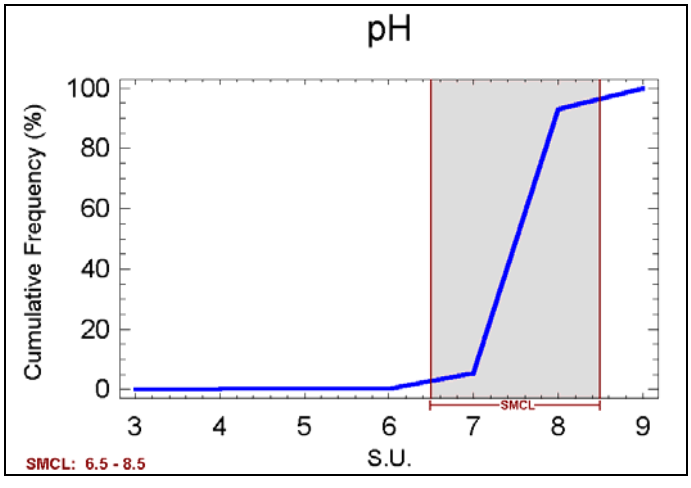


Figure F-8 Cumulative frequency curve for pH, BMU 2

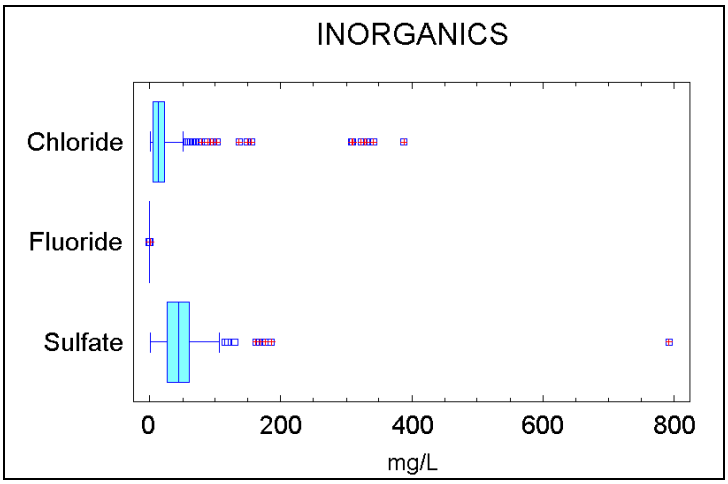


Figure F-9 Comparative boxplots of inorganics measurements

BMU2: INORGANICS SUMMARY STATISTICS						
	CHLORIDE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**0.9500**	**388.0000**	**14.5000**	**19.7000**
BLUEGRASS (INNER & OUTER):	04/26/95	09/21/00	0.9500	150.0000	18.8000	14.3000
MISSISSIPPIAN PLATEAU:	04/26/95	10/11/00	2.1000	155.0000	5.1300	3.6000
EASTERN COAL FIELD:	05/08/95	03/15/00	1.1300	40.3000	3.1700	1.4000
OHIO RIVER ALLUVIUM:	04/26/95	03/07/00	4.4000	388.0000	17.9000	19.7000
	FLUORIDE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**< 0.0230**	**1.9000**	**0.1400**	**0.1300**
BLUEGRASS (INNER & OUTER):	04/26/95	09/21/00	< 0.0230	0.6440	0.1420	0.1200
MISSISSIPPIAN PLATEAU:	04/26/95	10/11/00	< 0.0230	1.9000	0.1580	0.1100
EASTERN COAL FIELD:	05/08/95	03/15/00	< 0.0230	1.2100	0.0550	0.0500
OHIO RIVER ALLUVIUM:	04/26/95	03/07/00	0.0660	1.1600	0.1400	0.1300
	SULFATE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**0.6700**	**792.0000**	**44.6000**	**12.1000**
BLUEGRASS (INNER & OUTER):	04/26/95	09/21/00	0.6700	792.0000	47.6000	31.0000
MISSISSIPPIAN PLATEAU:	04/26/95	10/11/00	5.0400	95.8000	27.9000	12.1000
EASTERN COAL FIELD:	05/08/95	03/15/00	1.3400	23.3000	12.3500	12.7000
OHIO RIVER ALLUVIUM:	04/26/95	03/07/00	7.5000	106.0000	53.0000	28.9000

Table E-10 Inorganics, Summary Statistics

BMU2: INORGANICS SUMMARY TABLE				
		CHLORIDE	FLUORIDE	SULFATE
NUMBER OF SAMPLES	TOTAL:	283	281	283
BY REGION:	BLUEGRASS (INNER & OUTER):	123	122	123
	MISSISSIPPIAN PLATEAU:	53	53	53
	EASTERN COAL FIELD:	26	26	26
	OHIO RIVER ALLUVIUM:	81	80	81
NUMBER OF DETECTIONS	TOTAL:	283	276	282
	% DETECTS (vs SAMPLES):	100.00%	98.22%	99.65%
BY REGION:	BLUEGRASS (INNER & OUTER):	123	120	122
	MISSISSIPPIAN PLATEAU:	53	51	53
	EASTERN COAL FIELD:	26	25	26
	OHIO RIVER ALLUVIUM:	81	80	81
NUMBER OF SITES	TOTAL:	68	67	68
BY REGION:	BLUEGRASS (INNER & OUTER):	33	32	32
	MISSISSIPPIAN PLATEAU:	14	14	14
	EASTERN COAL FIELD:	6	6	6
	OHIO RIVER ALLUVIUM:	15	15	15
NUMBER OF SITES WITH DETECTIONS	TOTAL:	68	66	67
	% SITES W/DETECTIONS:	100.00%	98.51%	98.53%
BY REGION:	BLUEGRASS (INNER & OUTER):	33	31	33
	MISSISSIPPIAN PLATEAU:	14	14	14
	EASTERN COAL FIELD:	6	6	6
	OHIO RIVER ALLUVIUM:	15	15	14
NUMBER OF DETECTIONS ABOVE THE MCL	TOTAL:	7	0	1
	% DETECTIONS > MCL:	2.47%	0.00%	0.35%
	% SAMPLES > MCL:	2.47%	0.00%	0.35%
BY REGION:	BLUEGRASS (INNER & OUTER):	0	0	1
	MISSISSIPPIAN PLATEAU:	0	0	0
	EASTERN COAL FIELD:	0	0	0
	OHIO RIVER ALLUVIUM:	7	0	0

	MCL (mg/L)	Secondary (mg/L)	Other
CHLORIDE	-	250.000	-
FLUORIDE	4.000	-	-
SULFATE	-	250.000	-

Table E-11 Inorganics, Samples Summary

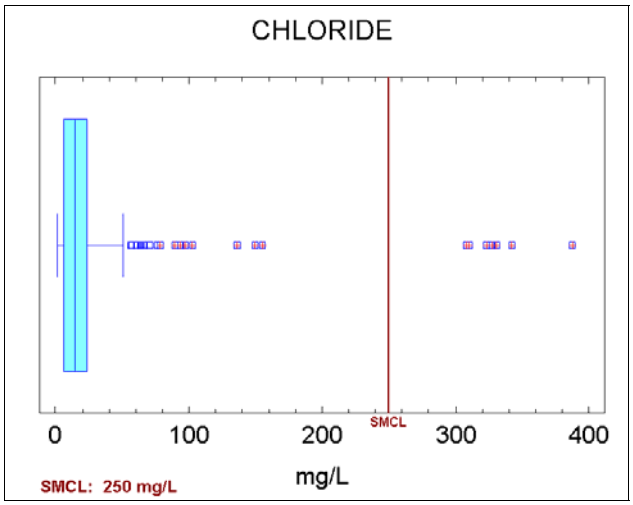


Figure F-12 Boxplot of chloride measurements, BMU 2

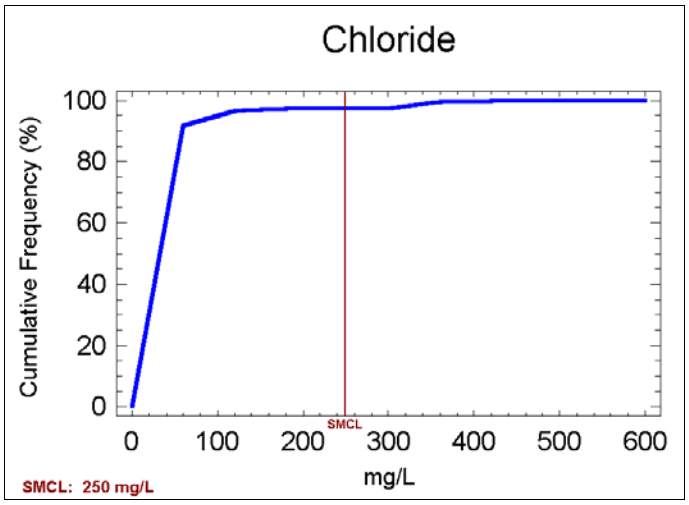


Figure F-12 Cumulative frequency curve for chloride, BMU 2

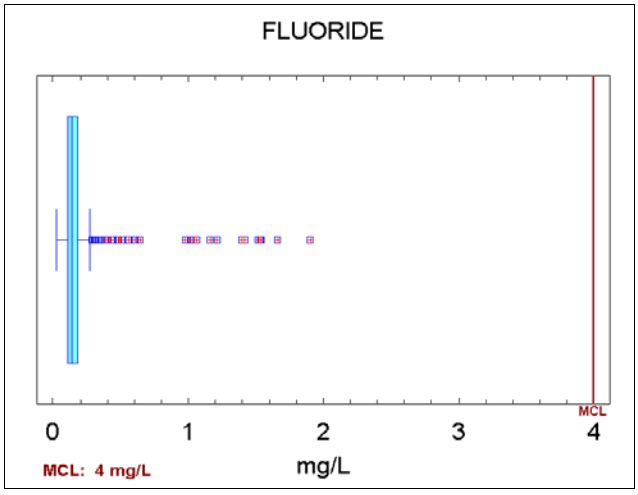


Figure F-14 Boxplot of fluoride measurements, BMU 2

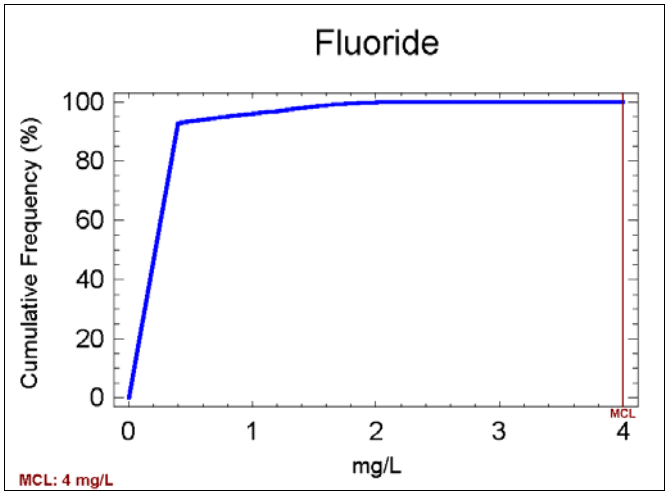


Figure F-15 Cumulative frequency curve for fluoride, BMU 2

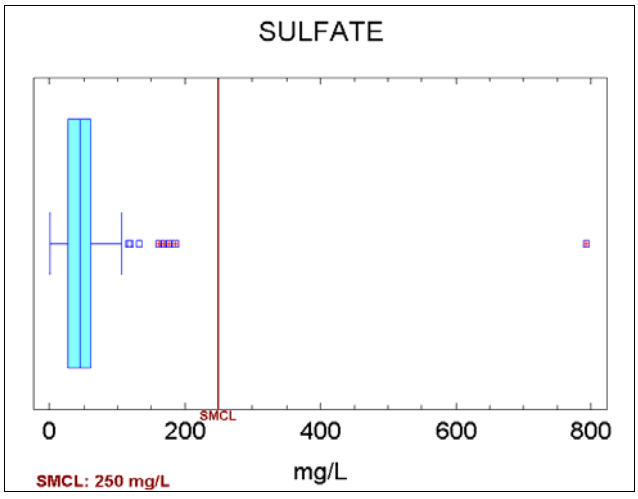


Figure F-16 Boxplot of sulfate measurements, BMU 2

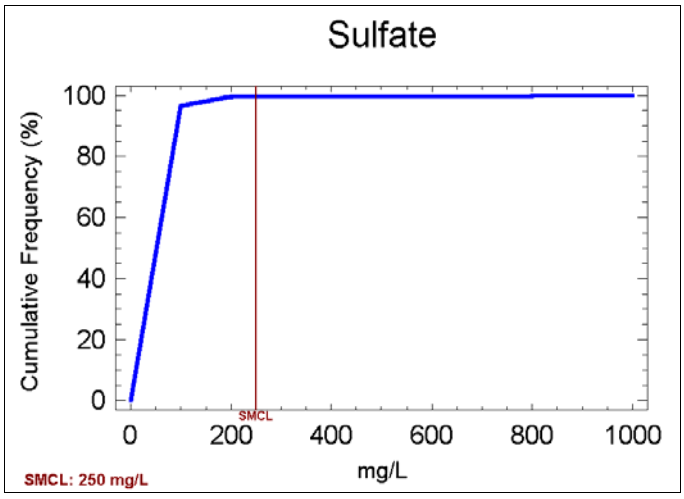


Figure F-17 Cumulative frequency curve for sulfate, BMU 2

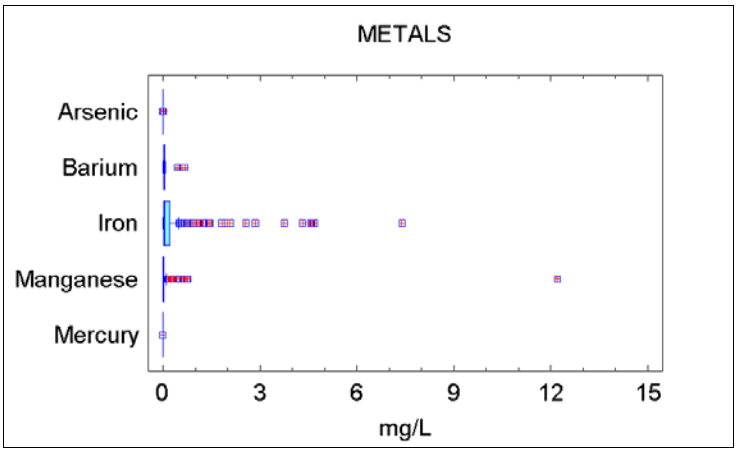


Figure F-18 Comparative boxplots of metals measurements

BMU2: METALS SUMMARY STATISTICS						
	ARSENIC					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	03/03/97	12/12/01	< 0.0020	< 0.0020	< 0.0020	< 0.0020
BLUEGRASS (INNER & OUTER):	03/03/97	12/12/01	< 0.0020	0.0040	< 0.0020	< 0.0020
MISSISSIPPIAN PLATEAU:	05/20/98	11/07/01	< 0.0020	0.0050	< 0.0020	< 0.0020
EASTERN COAL FIELD:	03/10/98	05/30/00	< 0.0020	< 0.0020	< 0.0020	< 0.0020
OHIO RIVER ALLUVIUM:	03/03/97	12/12/01	< 0.0020	0.0030	< 0.0020	< 0.0020
	BARIUM					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	03/03/97	12/12/01	< 0.0010	0.6720	0.0380	0.3900
BLUEGRASS (INNER & OUTER):	03/03/97	12/12/01	0.0080	0.4580	0.0280	0.0280
MISSISSIPPIAN PLATEAU:	05/20/98	11/07/01	0.0140	0.7600	0.0410	0.0390
EASTERN COAL FIELD:	03/10/98	10/03/01	0.0170	0.6720	0.0350	-
OHIO RIVER ALLUVIUM:	02/10/98	12/12/01	< 0.0010	0.0790	0.0475	0.0390
	IRON					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	03/03/97	12/12/01	< 0.0010	7.4000	0.0680	< 0.0050
BLUEGRASS (INNER & OUTER):	03/03/97	12/12/01	< 0.0050	7.4000	0.1070	0.0390
MISSISSIPPIAN PLATEAU:	05/20/98	11/07/01	0.0090	3.7700	0.1225	0.0180
EASTERN COAL FIELD:	03/10/98	05/30/00	< 0.0070	2.0900	0.0570	< 0.0070
OHIO RIVER ALLUVIUM:	02/10/98	10/03/01	< 0.0010	4.6100	0.0075	< 0.0050
	MANGANESE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	03/03/97	12/12/01	< 0.0010	12.2000	0.0100	< 0.0010
BLUEGRASS (INNER & OUTER):	03/03/97	12/12/01	< 0.0010	12.2000	0.0140	0.0040
MISSISSIPPIAN PLATEAU:	05/20/98	11/07/01	< 0.0010	0.2930	0.0070	0.0050
EASTERN COAL FIELD:	03/10/98	05/30/00	< 0.0010	0.0510	0.0060	0.0020
OHIO RIVER ALLUVIUM:	02/10/98	10/03/01	< 0.0010	0.7510	0.0155	< 0.0010
	MERCURY					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	02/10/98	12/12/01	< 0.000050	0.000056	< 0.000050	< 0.000050
BLUEGRASS (INNER & OUTER):	02/10/98	12/12/01	< 0.000050	< 0.000050	< 0.000050	< 0.000050
MISSISSIPPIAN PLATEAU:	05/20/98	11/07/01	< 0.000050	0.000056	< 0.000050	< 0.000050
EASTERN COAL FIELD:	03/10/98	05/30/00	< 0.000050	< 0.000050	< 0.000050	< 0.000050
OHIO RIVER ALLUVIUM:	02/10/98	10/03/01	< 0.000050	< 0.000050	< 0.000050	< 0.000050

Table E-19 Metals, Summary Statistics

BMU2: METALS SUMMARY TABLE						
		ARSENIC	BARIUM	IRON[1]	MANGANESE [1]	MERCURY [2]
NUMBER OF SAMPLES	TOTAL:	225	226	226	226	225
BY REGION:	BLUEGRASS (INNER & OUTER):	108	109	109	109	108
	MISSISSIPPIAN PLATEAU:	48	48	48	48	48
	EASTERN COAL FIELD:	15	15	15	15	15
	OHIO RIVER ALLUVIUM:	54	54	54	54	54
NUMBER OF DETECTIONS	TOTAL:	10	225	197	197	1
	% DETECTS (vs SAMPLES):	4.00%	99.56%	87.17%	87.17%	0.44%
BY REGION:	BLUEGRASS (INNER & OUTER):	5	109	107	105	0
	MISSISSIPPIAN PLATEAU:	3	48	48	45	1
	EASTERN COAL FIELD:	0	15	13	12	0
	OHIO RIVER ALLUVIUM:	2	53	29	35	0
NUMBER OF SITES	TOTAL:	55	55	55	55	54
BY REGION:	BLUEGRASS (INNER & OUTER):	28	28	28	28	27
	MISSISSIPPIAN PLATEAU:	10	10	10	10	10
	EASTERN COAL FIELD:	5	5	5	5	5
	OHIO RIVER ALLUVIUM:	12	12	12	12	12
NUMBER OF SITES WITH DETECTIONS	TOTAL:	10	55	52	54	1
	% SITES W/DETECTIONS:	18.52%	100.00%	94.55%	98.18%	1.85%
BY REGION:	BLUEGRASS (INNER & OUTER):	5	28	28	28	0
	MISSISSIPPIAN PLATEAU:	3	10	10	9	1
	EASTERN COAL FIELD:	0	5	4	5	0
	OHIO RIVER ALLUVIUM:	2	12	10	12	0
NUMBER OF DETECTIONS ABOVE THE MCL	TOTAL:	0	0	39	35	0
	% DETECTIONS > MCL:	0.00%	0.00%	19.80%	17.77%	0.00%
	% SAMPLES > MCL:	0.00%	0.00%	17.26%	15.49%	0.00%
BY REGION:	BLUEGRASS (INNER & OUTER):	0	0	26	20	0
	MISSISSIPPIAN PLATEAU:	0	0	11	4	0
	EASTERN COAL FIELD:	0	0	1	1	0
	OHIO RIVER ALLUVIUM:	0	0	3	10	0

[1]SDWR used in absence of MCL
[2] 0002-1576 (Brueggemann Well) - no samples analyzed for mercury

	MCL (mg/L)	Secondary (mg/L)	Other
ARSENIC	0.010	-	-
BARIUM	2.000	-	-
IRON	-	0.300	-
MANGANESE	-	0.050	-
MERCURY	0.002	-	-

EPA uses T (not D) for MCL standards
Dissolved results were not considered in this study

Table E-20 Metals, Samples Summary

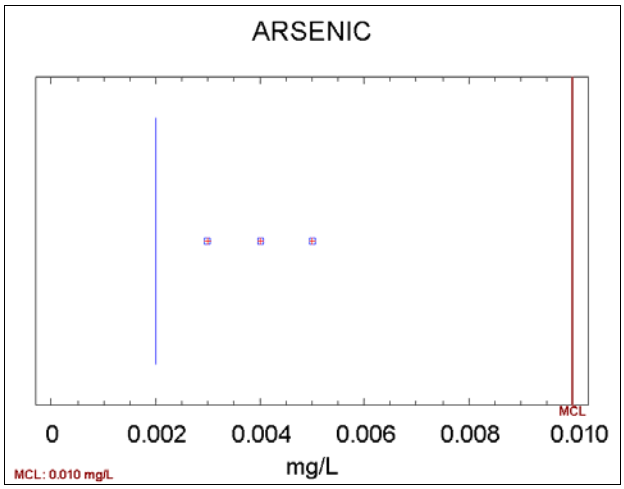


Figure F-21 Boxplot of arsenic measurements, BMU 2

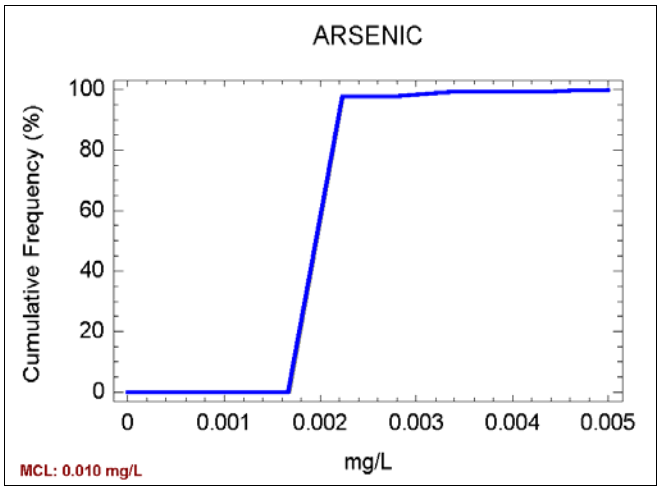


Figure F-22 Cumulative frequency curve for arsenic, BMU 2

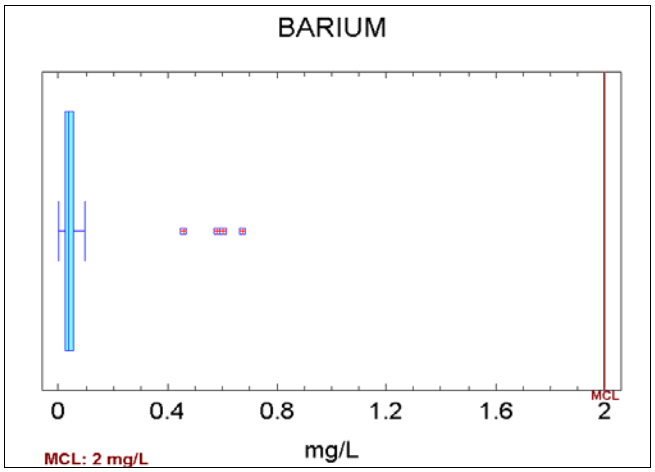


Figure F-23 Boxplot of barium measurements, BMU 2

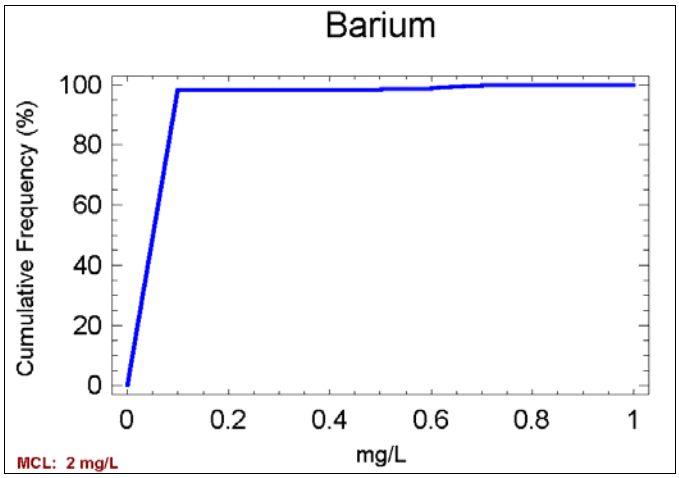


Figure F-24 Cumulative frequency curve for barium, BMU 2

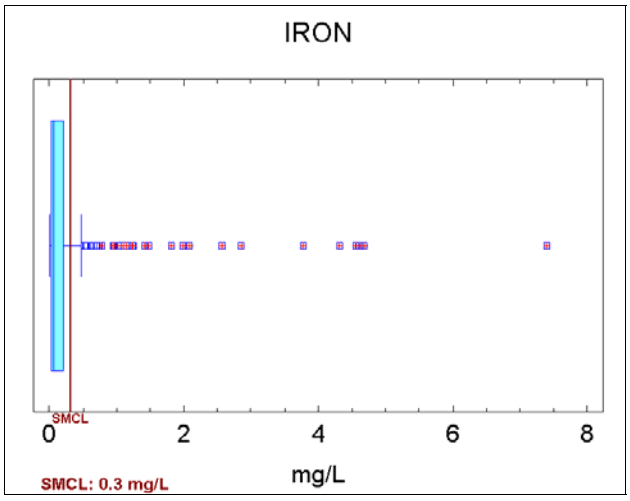


Figure F-25 Boxplot of iron measurements, BMU 2

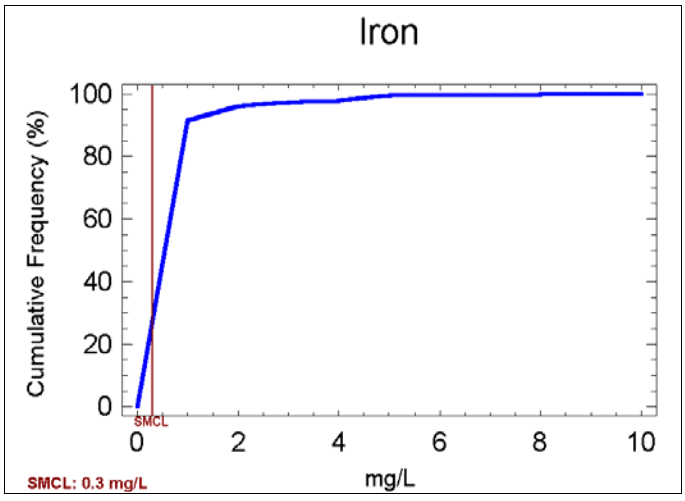


Figure F-26 Cumulative frequency curve for iron, BMU 2

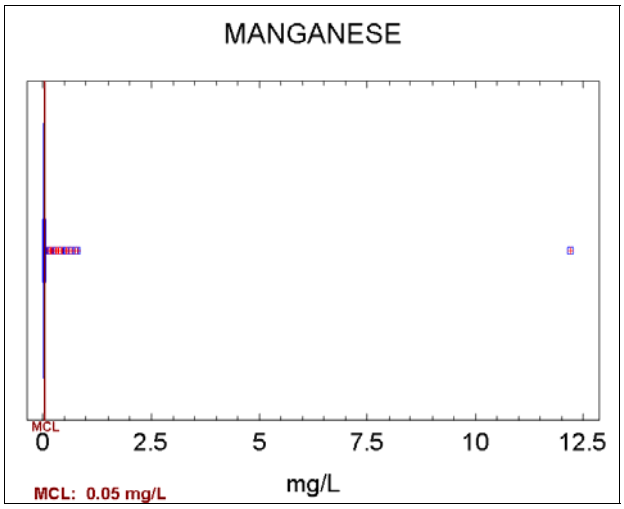


Figure F-27 Boxplot of manganese measurements, BMU 2

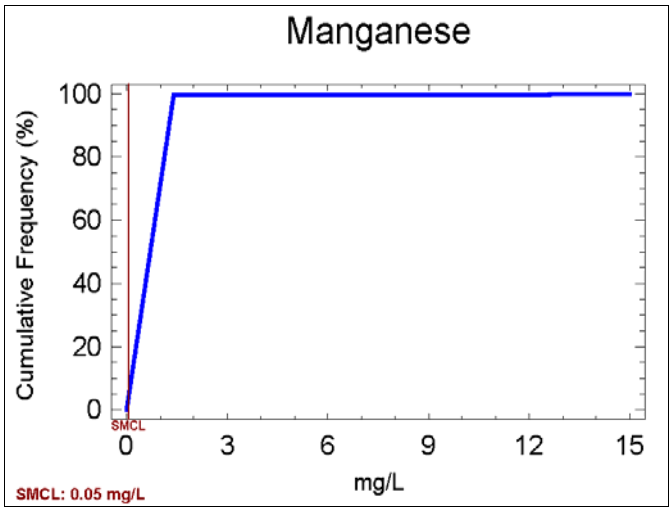


Figure F-28 Cumulative frequency curve for manganese, BMU 2

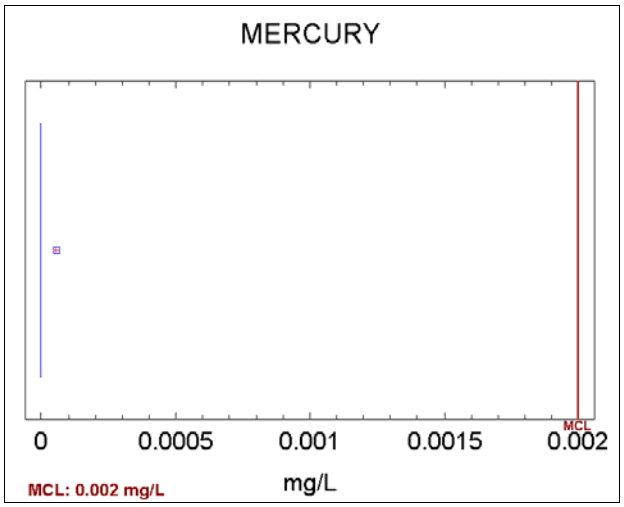


Figure F-29 Boxplot of mercury measurements, BMU 2

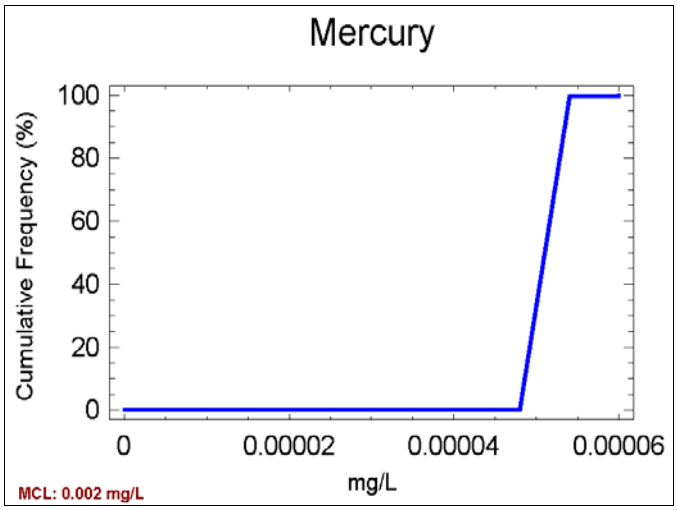


Figure F-30 Cumulative frequency curve for mercury, BMU 2

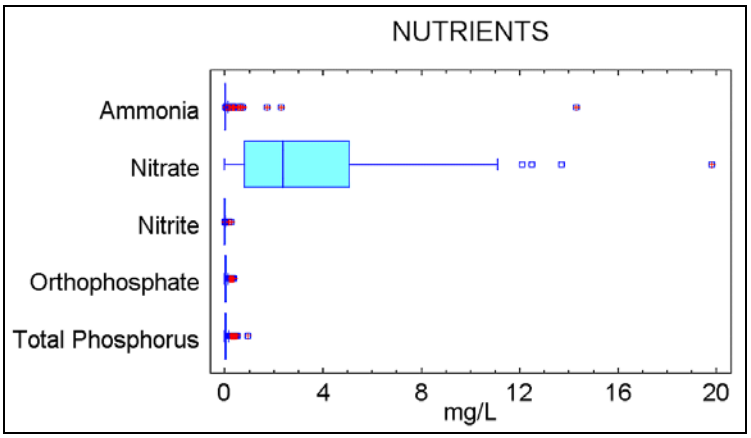


Figure F-31 Comparative boxplots of nutrients measurements

BMU2: NUTRIENTS SUMMARY STATISTICS						
	AMMONIA					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**0.016**	**14.30**	**< 0.02**	**< 0.02**
BLUEGRASS (INNER & OUTER):	04/25/95	09/27/00	< 0.02	14.30	< 0.02	< 0.05
MISSISSIPPIAN PLATEAU:	04/25/95	10/11/00	< 0.02	0.15	< 0.02	< 0.05
EASTERN COAL FIELD:	05/08/95	05/30/00	< 0.02	0.74	< 0.05	< 0.02
OHIO RIVER ALLUVIUM:	04/25/95	10/04/00	0.016	0.72	< 0.02	< 0.02
	NITRATE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**< 0.02**	**19.80**	**2.38**	**< 0.007**
BLUEGRASS (INNER & OUTER):	04/25/95	04/17/00	< 0.007	19.80	2.76	< 0.007
MISSISSIPPIAN PLATEAU:	04/25/95	10/11/00	< 0.007	4.25	0.90	0.090
EASTERN COAL FIELD:	05/08/95	03/15/00	< 0.007	3.92	0.18	0.090
OHIO RIVER ALLUVIUM:	04/25/95	03/07/00	< 0.02	12.50	5.58	< 0.02
	NITRITE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**0.0006**	**0.259**	**0.002**	**< 0.02**
BLUEGRASS (INNER & OUTER):	04/25/95	04/17/00	< 0.02	0.259	0.002	< 0.02
MISSISSIPPIAN PLATEAU:	04/25/95	10/11/00	0.0006	0.014	0.00375	< 0.02
EASTERN COAL FIELD:	05/08/95	03/15/00	< 0.001	0.026	0.001165	< 0.02
OHIO RIVER ALLUVIUM:	04/25/95	03/07/00	< 0.001	0.175	0.002	< 0.02
	PHOSPHATE, ORTHO					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**< 0.003**	**0.387**	**0.019**	**< 0.059**
BLUEGRASS (INNER & OUTER):	04/25/95	09/27/00	< 0.059	0.387	0.021835	< 0.059
MISSISSIPPIAN PLATEAU:	04/25/95	10/11/00	< 0.003	0.108	0.01833	< 0.059
EASTERN COAL FIELD:	05/08/95	05/30/00	< 0.003	0.092	0.0905	< 0.059
OHIO RIVER ALLUVIUM:	04/25/95	10/04/00	< 0.003	0.216	0.021	< 0.059
	PHOSPHATE, TOTAL					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**< 0.005**	**0.95**	**0.022**	**< 0.121**
BLUEGRASS (INNER & OUTER):	04/25/95	03/08/00	< 0.005	0.506	0.0495	< 0.121
MISSISSIPPIAN PLATEAU:	04/25/95	10/11/00	< 0.005	0.228	0.009	< 0.121
EASTERN COAL FIELD:	05/08/95	03/15/00	< 0.005	0.4	0.01	< 0.121
OHIO RIVER ALLUVIUM:	04/25/95	03/07/00	< 0.005	0.95	0.0095	< 0.121

Table E-32 Nutrients, Summary Statistics

BMU2: NUTRIENTS SUMMARY TABLE						
		AMMONIA	NITRATE	NITRITE	PHOSPHATE, ORTHO	PHOSPHATE, TOTAL
NUMBER OF SAMPLES	TOTAL:	287	287	287	287	287
BY REGION:	BLUEGRASS (INNER & OUTER):	126	121	121	134	116
	MISSISSIPPIAN PLATEAU:	54	54	54	61	51
	EASTERN COAL FIELD:	25	26	26	27	25
	OHIO RIVER ALLUVIUM:	82	80	81	97	76
NUMBER OF DETECTIONS	TOTAL:	77	268	135	215	143
	% DETECTS (vs SAMPLES):	26.83%	95.37%	47.87%	67.40%	53.36%
BY REGION:	BLUEGRASS (INNER & OUTER):	31	117	42	81	83
	MISSISSIPPIAN PLATEAU:	18	52	24	33	29
	EASTERN COAL FIELD:	7	22	12	19	10
	OHIO RIVER ALLUVIUM:	21	77	57	82	21
NUMBER OF SITES	TOTAL:	64	67	67	67	65
BY REGION:	BLUEGRASS (INNER & OUTER):	32	32	32	32	31
	MISSISSIPPIAN PLATEAU:	13	14	14	14	13
	EASTERN COAL FIELD:	6	6	6	6	6
	OHIO RIVER ALLUVIUM:	13	15	15	15	15
NUMBER OF SITES WITH DETECTIONS	TOTAL:	29	61	27	44	51
	% SITES W/DETECTIONS:	45.31%	91.04%	40.30%	65.67%	78.46%
BY REGION:	BLUEGRASS (INNER & OUTER):	12	30	9	20	27
	MISSISSIPPIAN PLATEAU:	7	13	5	8	10
	EASTERN COAL FIELD:	3	3	3	4	5
	OHIO RIVER ALLUVIUM:	7	15	10	12	9
NUMBER OF DETECTIONS ABOVE THE MCL	TOTAL:	32	12	0	-	-
	% DETECTIONS > MCL:	41.56%	4.48%	0.00%	-	-
	% SAMPLES > MCL:	0.20%	0.34%	0.00%	-	-
BY REGION:	BLUEGRASS (INNER & OUTER):	12	4	0	-	-
	MISSISSIPPIAN PLATEAU:	2	0	0	-	-
	EASTERN COAL FIELD:	5	0	0	-	-
	OHIO RIVER ALLUVIUM:	13	8	0	-	-

[1]Ortho-p is not currently regulated, but Texas has a surface water quality standard for ortho-p of 0.04 mg/L.

[2]Total-p is not currently regulated, but EPA water quality criteria state that phosphates should not exceed 0.100 mg/l in streams or flowing waters not discharging into lakes or reservoirs to control algal growth.

	MCL (mg/L)	Secondary (mg/L)
AMMONIA	0.110	-
NITRATE (as N)	10.000	-
NITRITE (as N)	1.000	-
ORTHOPHOSPHATE	-	-
TOTAL PHOSPHORUS	-	-

EPA uses T (not D) for MCL standards
Dissolved results were not considered in this study

Table E-33 Nutrients, Samples Summary

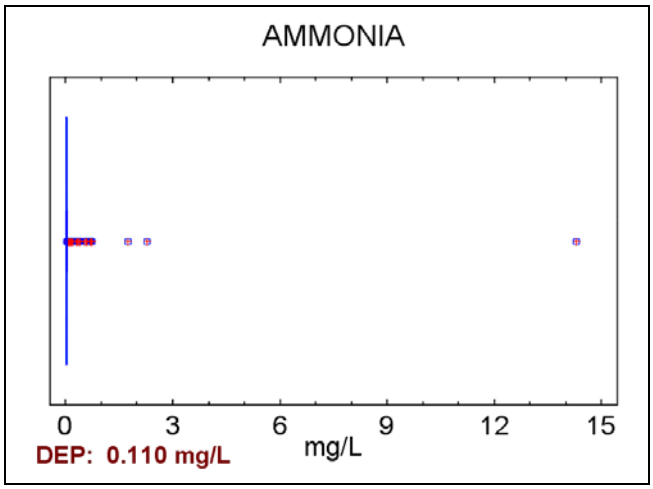


Figure F-34 Boxplot of ammonia measurements, BMU 2

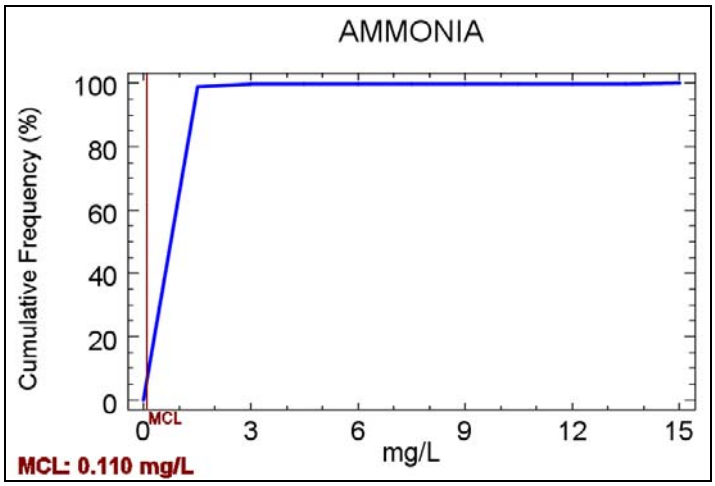


Figure F-35 Cumulative frequency curve for ammonia, BMU 2

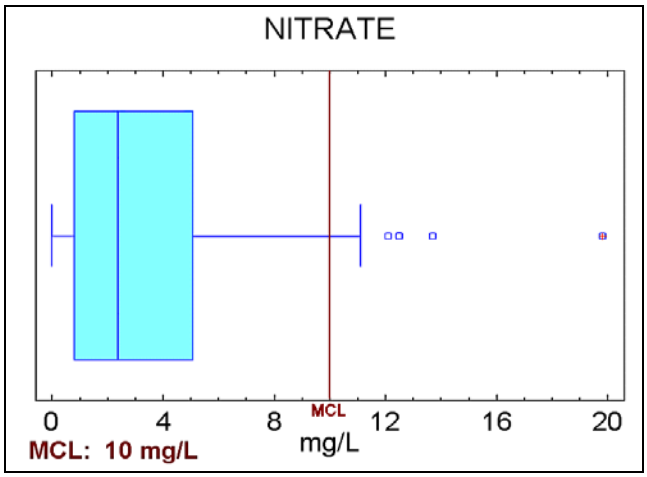


Figure F-36 Boxplot of nitrate measurements, BMU 2

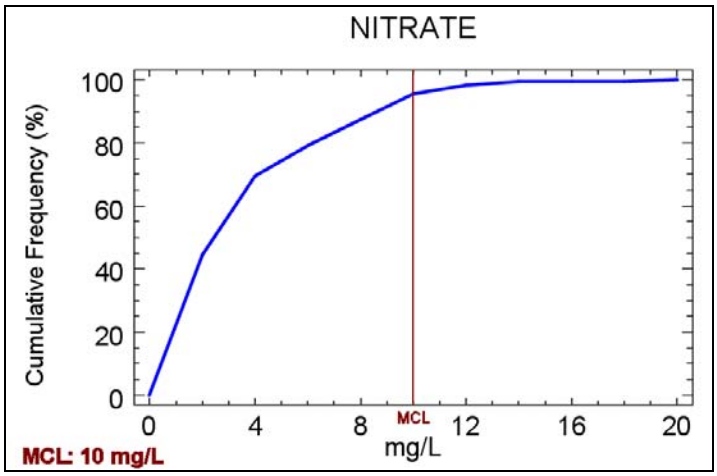


Figure F-37 Cumulative frequency curve for nitrate, BMU 2

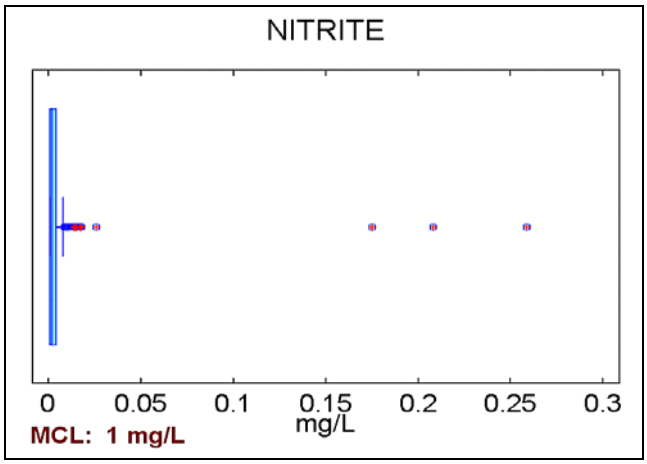


Figure F-38 Boxplot of nitrite measurements, BMU 2

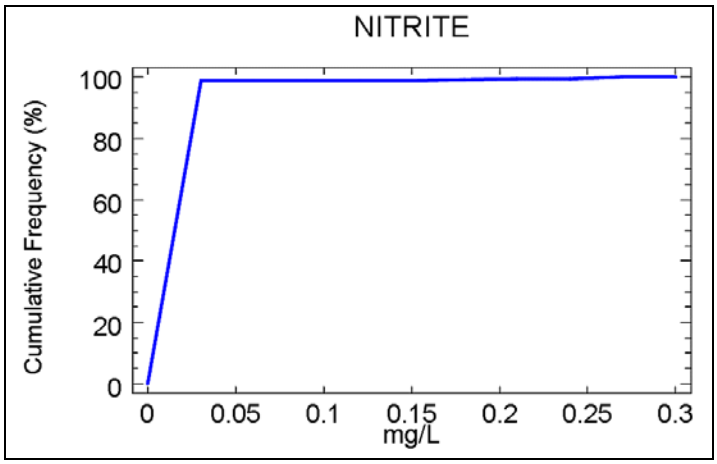


Figure F-39 Cumulative frequency curve for nitrite, BMU 2

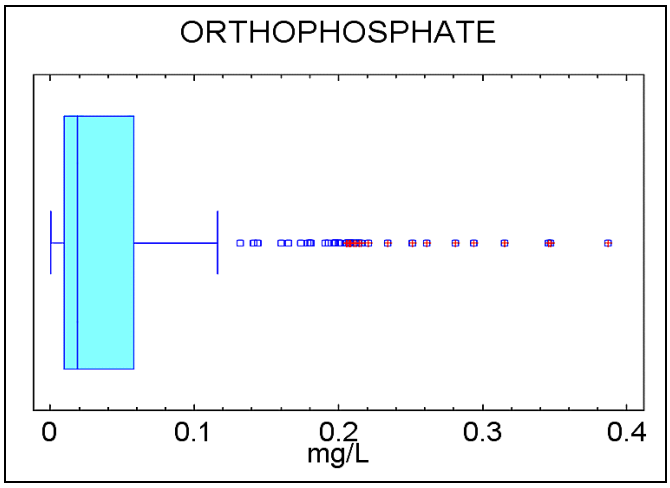


Figure F-40 Boxplot of orthophosphate measurements, BMU 2

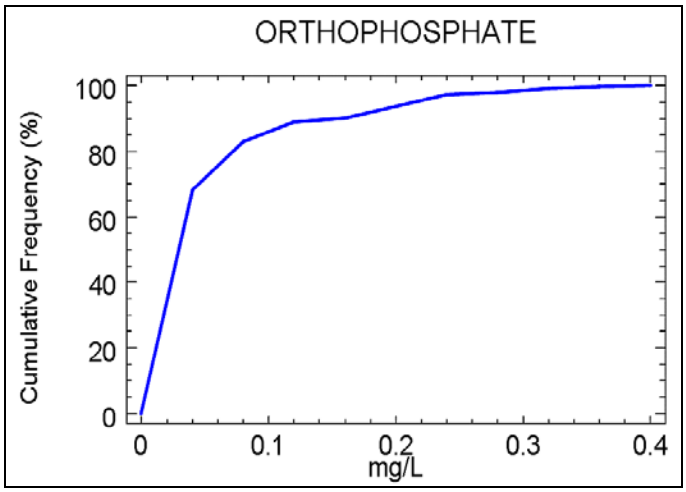


Figure F-41 Cumulative frequency curve for orthophosphate, BMU 2

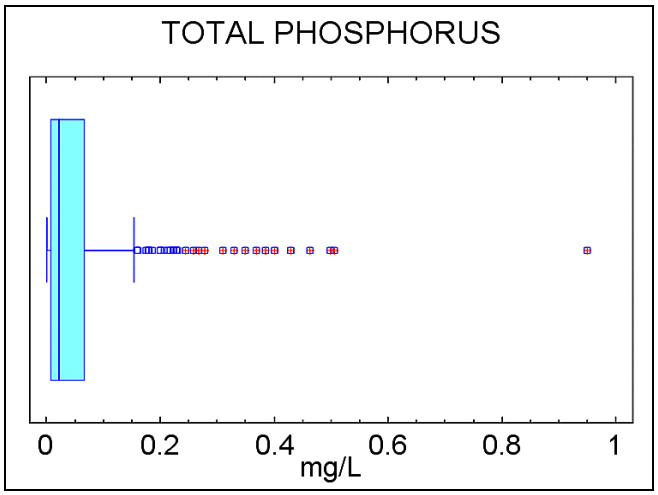


Figure F-42 Boxplot of total phosphorus measurements, BMU 2

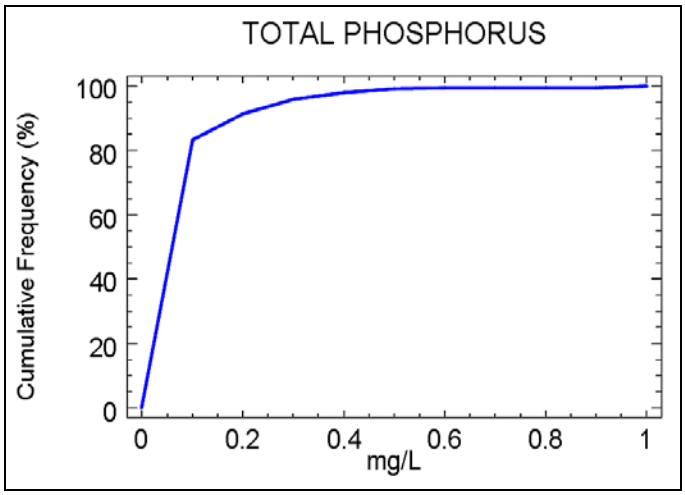


Figure F-43 Cumulative frequency curve for total phosphorus, BMU 2

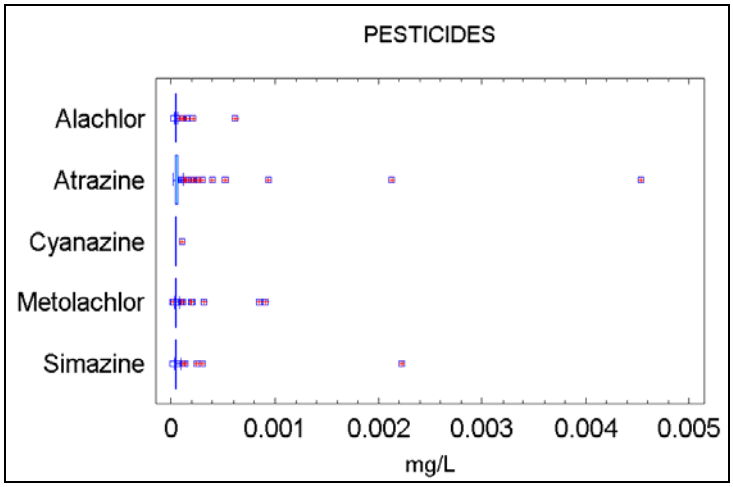


Figure F-44 Comparative boxplots of pesticides measurements

BMU2: RESIDUES SUMMARY STATISTICS						
	ALACHLOR					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**12/12/01**	**< 0.000020**	**0.000614**	**< 0.000040**	**< 0.000040**
BLUEGRASS (INNER & OUTER):	04/26/95	12/12/01	< 0.000020	0.000110	< 0.000040	< 0.000040
MISSISSIPPIAN PLATEAU:	04/26/95	11/07/01	< 0.000020	0.000614	< 0.000040	< 0.000040
EASTERN COAL FIELD:	05/08/95	05/30/00	< 0.000020	< 0.000060	< 0.000040	< 0.000040
OHIO RIVER ALLUVIUM:	04/26/95	10/03/01	< 0.000020	0.000033	< 0.000040	< 0.000040
	ATRAZINE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**12/12/01**	**0.000018**	**0.004535**	**< 0.000040**	**< 0.000040**
BLUEGRASS (INNER & OUTER):	04/26/95	12/12/01	0.000018	0.000523	< 0.000040	< 0.000040
MISSISSIPPIAN PLATEAU:	04/26/95	11/07/01	0.000019	0.004535	< 0.000040	< 0.000040
EASTERN COAL FIELD:	05/08/95	05/30/00	< 0.000040	< 0.000300	< 0.000050	< 0.000040
OHIO RIVER ALLUVIUM:	04/26/95	10/03/01	< 0.000040	< 0.000300	< 0.000050	< 0.000040
	CYANAZINE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**12/12/01**	**< 0.000040**	**< 0.000100**	**< 0.000040**	**< 0.000040**
BLUEGRASS (INNER & OUTER):	04/26/95	12/12/01	< 0.000040	< 0.000100	< 0.000040	< 0.000040
MISSISSIPPIAN PLATEAU:	04/26/95	11/07/01	< 0.000040	< 0.000100	< 0.000040	< 0.000040
EASTERN COAL FIELD:	05/08/95	05/30/00	< 0.000040	< 0.000100	< 0.000050	< 0.000040
OHIO RIVER ALLUVIUM:	04/26/95	10/03/01	< 0.000040	< 0.000100	< 0.000050	< 0.000040
	METOLACHLOR					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**12/12/01**	**0.000010**	**0.000908**	**< 0.000040**	**< 0.000040**
BLUEGRASS (INNER & OUTER):	04/26/95	12/12/01	0.000010	0.000908	< 0.000040	< 0.000040
MISSISSIPPIAN PLATEAU:	04/26/95	11/07/01	0.000019	0.000312	< 0.000040	< 0.000040
EASTERN COAL FIELD:	05/08/95	05/30/00	< 0.000040	< 0.000200	< 0.000050	< 0.000050
OHIO RIVER ALLUVIUM:	04/26/95	10/03/01	< 0.000040	< 0.000200	< 0.000050	< 0.000040
	SIMAZINE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**12/12/01**	**0.000017**	**0.002223**	**< 0.000040**	**< 0.000040**
BLUEGRASS (INNER & OUTER):	04/26/95	12/12/01	0.000030	< 0.000300	< 0.000040	< 0.000040
MISSISSIPPIAN PLATEAU:	04/26/95	11/07/01	0.000017	0.002223	< 0.000040	< 0.000040
EASTERN COAL FIELD:	05/08/95	05/30/00	< 0.000040	< 0.000300	< 0.000050	< 0.000040
OHIO RIVER ALLUVIUM:	04/26/95	10/03/01	< 0.000040	< 0.000300	< 0.000050	< 0.000040

Table E-45 Pesticides, Summary Statistics

BMU2: PESTICIDES SUMMARY TABLE						
		ALACHOR	ATRAZINE	CYANAZINE[1 2]	METOLACHLOR[1]	SIMAZINE[2]
NUMBER OF SAMPLES	TOTAL:	342	342	314	342	320
BY REGION:	BLUEGRASS (INNER & OUTER):	143	143	132	143	136
	MISSISSIPPIAN PLATEAU:	68	68	64	68	64
	EASTERN COAL FIELD:	25	25	23	25	23
	OHIO RIVER ALLUVIUM:	106	106	95	106	97
NUMBER OF DETECTIONS	TOTAL:	11	53	0	34	10
	% DETECTS (vs SAMPLES):	3.22%	15.50%	0.00%	9.94%	3.13%
BY REGION:	BLUEGRASS (INNER & OUTER):	6	35	0	30	6
	MISSISSIPPIAN PLATEAU:	6	15	0	4	4
	EASTERN COAL FIELD:	0	0	0	0	0
	OHIO RIVER ALLUVIUM:	2	3	0	0	0
NUMBER OF SITES	TOTAL:	64	64	63	64	63
BY REGION:	BLUEGRASS (INNER & OUTER):	31	31	31	31	31
	MISSISSIPPIAN PLATEAU:	12	12	11	12	11
	EASTERN COAL FIELD:	6	6	6	6	6
	OHIO RIVER ALLUVIUM:	15	15	15	15	15
NUMBER OF SITES WITH DETECTIONS	TOTAL:	8	18	0	9	5
	% SITES W/DETECTIONS:	12.50%	28.13%	0.00%	14.06%	7.94%
BY REGION:	BLUEGRASS (INNER & OUTER):	3	13	0	7	4
	MISSISSIPPIAN PLATEAU:	3	2	0	2	1
	EASTERN COAL FIELD:	0	0	0	0	0
	OHIO RIVER ALLUVIUM:	2	3	0	0	0
NUMBER OF DETECTIONS ABOVE THE MCL	TOTAL:	0	1	0	0	0
	% DETECTIONS > MCL:	0.00%	6.67%	0.00%	0.00%	0.00%
	% SAMPLES > MCL:	0.00%	0.16%	0.00%	0.00%	0.00%
BY REGION:	BLUEGRASS (INNER & OUTER):	0	0	0	0	0
	MISSISSIPPIAN PLATEAU:	0	1	0	0	0
	EASTERN COAL FIELD:	0	0	0	0	0
	OHIO RIVER ALLUVIUM:	0	0	0	0	0

[1]HAL used in absence of MCL

[2] 0001-5022 (Flaherty Well) - no samples analyzed for cyanazine or simazine

	MCL (mg/L)	HAL (mg/L)	Other
ALACHLOR	0.002	-	-
ATRAZINE	0.003	-	-
CYANAZINE	-	0.001	-
METOLACHLOR	-	0.100	-
SIMAZINE	0.004	-	-

Table E-46 Pesticides, Samples Summary

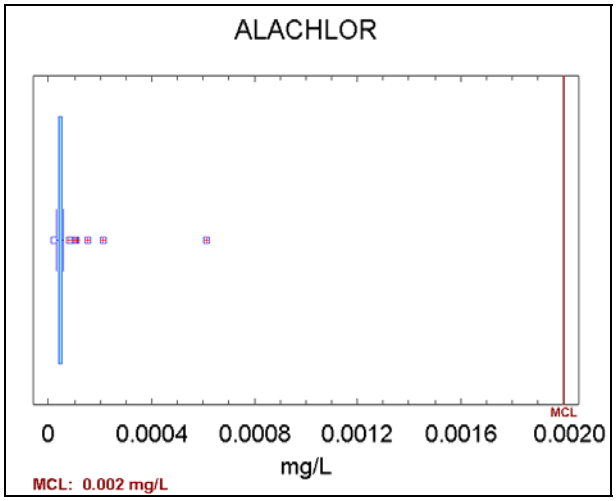


Figure F-47 Boxplot of alachlor measurements, BMU 2

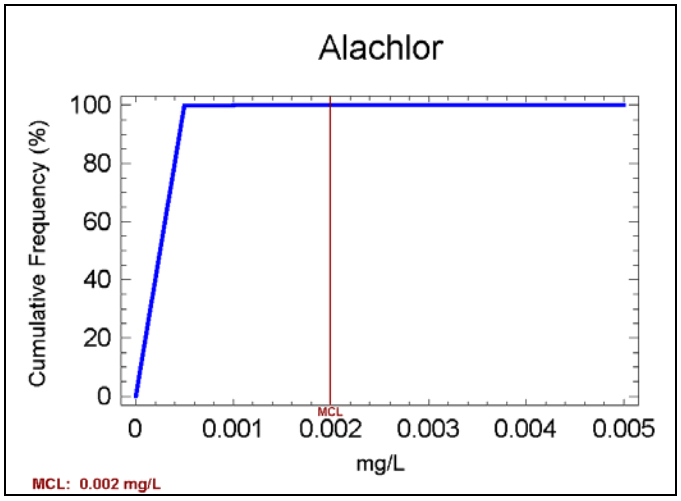


Figure F-48 Cumulative frequency curve for alachlor, BMU 2

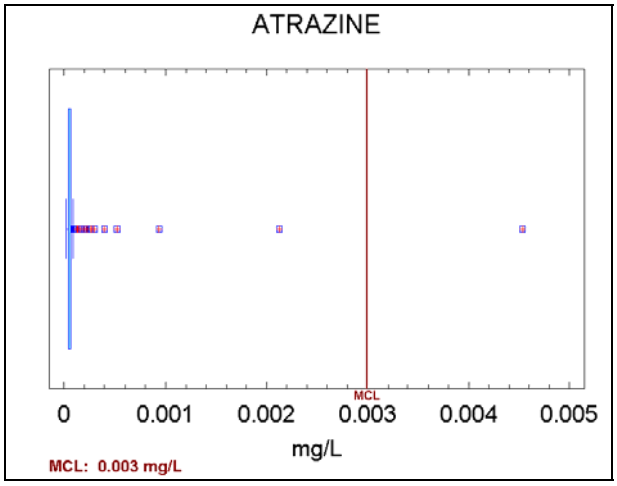


Figure F-49 Boxplot of atrazine measurements, BMU 2

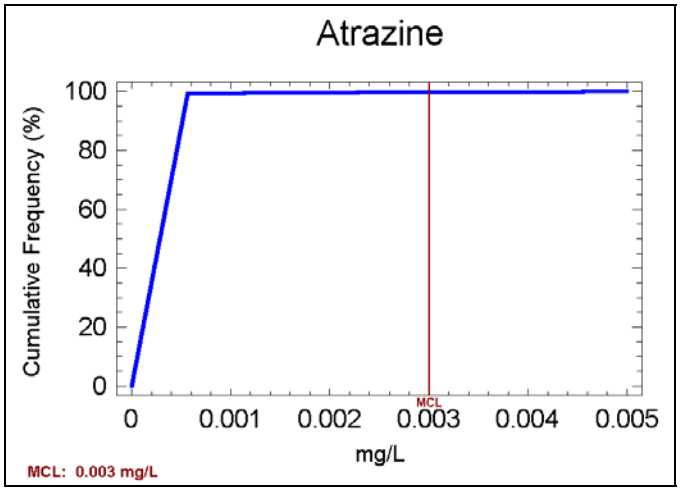


Figure F-50 Cumulative frequency curve for atrazine, BMU 2

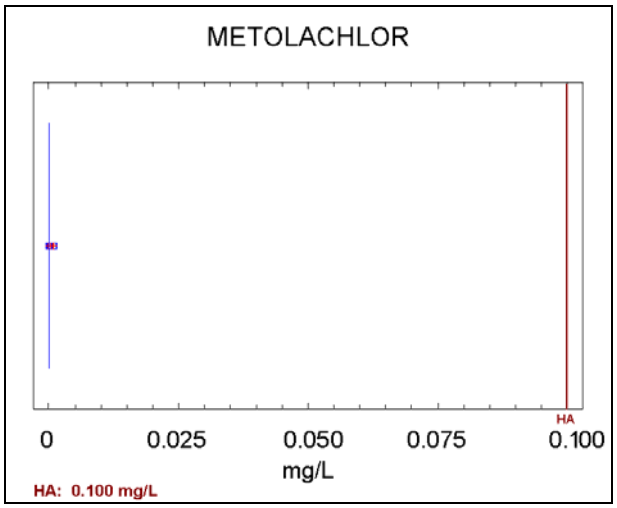


Figure F-51 Boxplot of metolachlor measurements, BMU 2

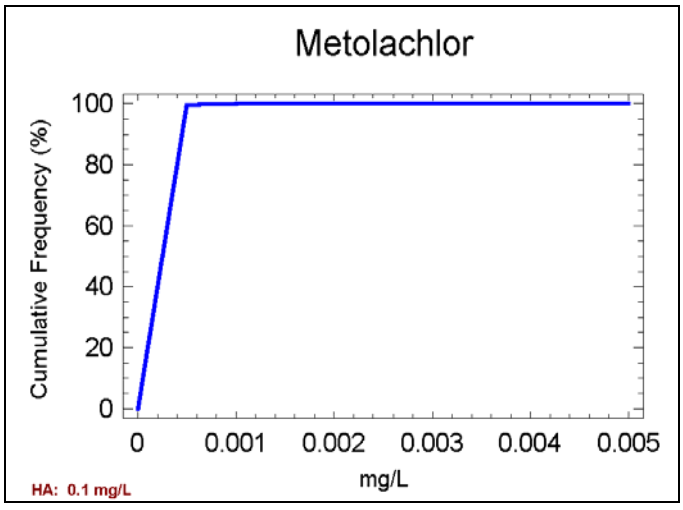


Figure F-52 Cumulative frequency curve for metolachlor, BMU 2

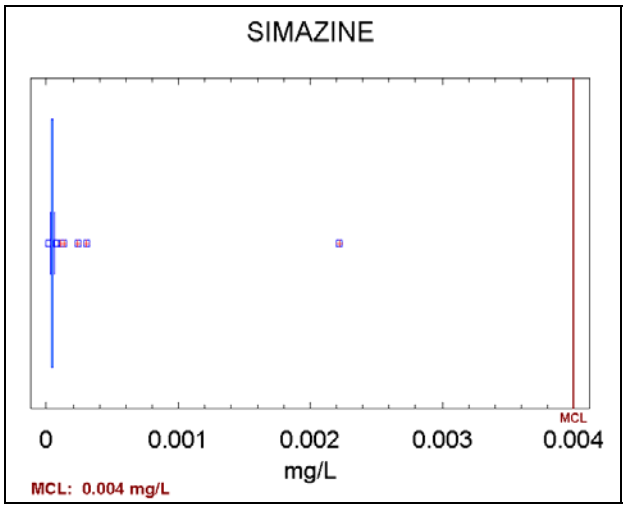


Figure F-53 Boxplot of simazine measurements, BMU 2

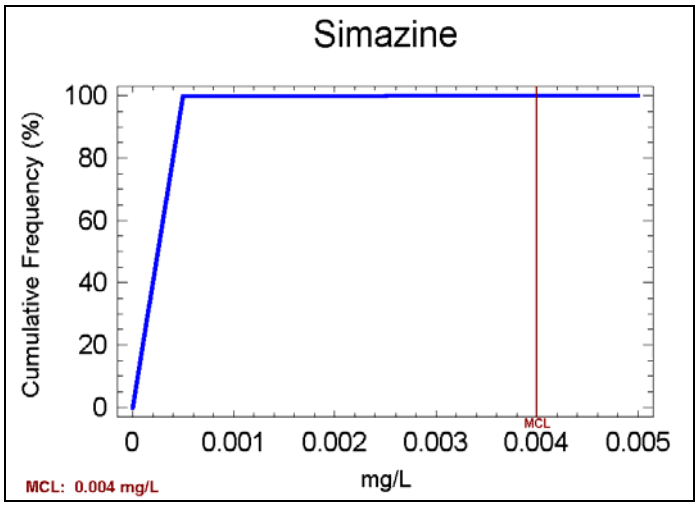


Figure F-54 Cumulative frequency curve for simazine, BMU 2

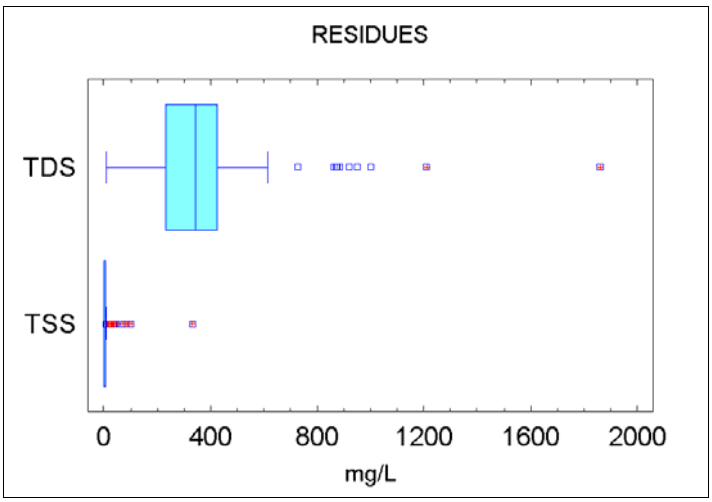


Figure F-55 Comparative boxplots of residues measurements

BMU2: RESIDUES SUMMARY STATISTICS						
	TDS (Total Dissolved Solids)					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**< 10**	**1860**	**342**	**234**
BLUEGRASS (INNER & OUTER):	04/26/95	09/27/00	46	1860	366	230
MISSISSIPPIAN PLATEAU:	04/26/95	10/11/00	24	422	234	234
EASTERN COAL FIELD:	05/08/95	05/30/00	20	450	140	96
OHIO RIVER ALLUVIUM:	04/26/95	10/04/00	< 10	1002	414	226
	TSS (Total Suspended Solids)					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**04/26/95**	**10/11/00**	**< 1**	**332**	**< 3**	**< 3**
BLUEGRASS (INNER & OUTER):	04/26/95	09/27/00	< 1	101	3	< 3
MISSISSIPPIAN PLATEAU:	04/26/95	10/11/00	< 1	41	3	< 3
EASTERN COAL FIELD:	05/08/95	05/30/00	< 1	332	< 3	< 3
OHIO RIVER ALLUVIUM:	04/26/95	10/04/00	< 1	31	< 3	< 3

Table E-56 Residues, Summary Statistics

BMU2: RESIDUES SUMMARY TABLE			
		TDS	TSS[1]
NUMBER OF SAMPLES	TOTAL:	315	315
BY REGION:	BLUEGRASS (INNER & OUTER):	133	132
	MISSISSIPPIAN PLATEAU:	59	59
	EASTERN COAL FIELD:	27	27
	OHIO RIVER ALLUVIUM:	96	97
NUMBER OF DETECTIONS	TOTAL:	314	178
	% DETECTS (vs SAMPLES):	99.68%	56.51%
BY REGION:	BLUEGRASS (INNER & OUTER):	133	91
	MISSISSIPPIAN PLATEAU:	59	39
	EASTERN COAL FIELD:	27	14
	OHIO RIVER ALLUVIUM:	95	34
NUMBER OF SITES	TOTAL:	66	65
BY REGION:	BLUEGRASS (INNER & OUTER):	32	31
	MISSISSIPPIAN PLATEAU:	13	13
	EASTERN COAL FIELD:	6	6
	OHIO RIVER ALLUVIUM:	15	15
NUMBER OF SITES WITH DETECTIONS	TOTAL:	66	51
	% SITES W/DETECTIONS:	100.00%	78.46%
BY REGION:	BLUEGRASS (INNER & OUTER):	32	27
	MISSISSIPPIAN PLATEAU:	13	9
	EASTERN COAL FIELD:	6	6
	OHIO RIVER ALLUVIUM:	15	9
NUMBER OF DETECTIONS ABOVE THE MCL	TOTAL:	34	11
	% DETECTIONS > MCL:	10.83%	6.18%
	% SAMPLES > MCL:	10.79%	3.49%
BY REGION:	BLUEGRASS (INNER & OUTER):	17	7
	MISSISSIPPIAN PLATEAU:	0	2
	EASTERN COAL FIELD:	0	2
	OHIO RIVER ALLUVIUM:	17	0

[1] Currently no water quality standard for TSS, but some KPDES permits use 35 mg/L for a monthly average

	MCL (mg/L)	Secondary (mg/L)	Other
TDS	-	500	-
TSS	-	-	35

Table E-57 Residues, Samples Summary

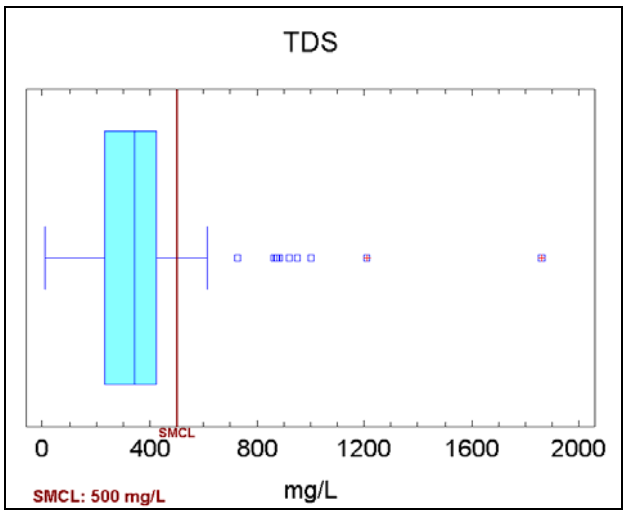


Figure F-58 Boxplot of TDS measurements, BMU 2

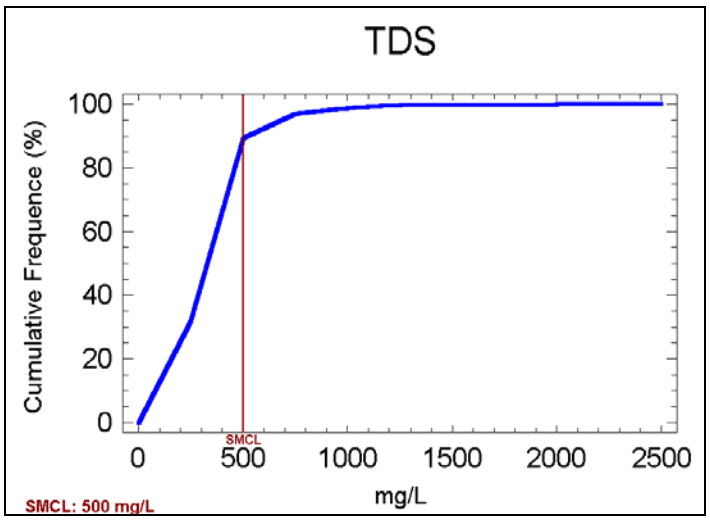


Figure F-59 Cumulative frequency curve for TDS, BMU 2

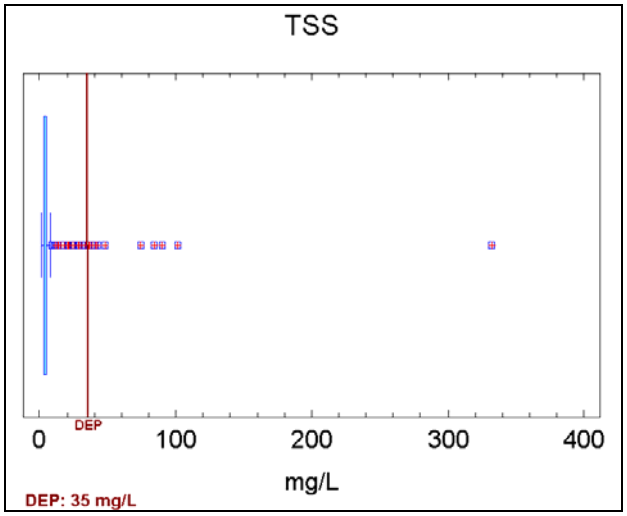


Figure F-60 Boxplot of TSS measurements, BMU 2

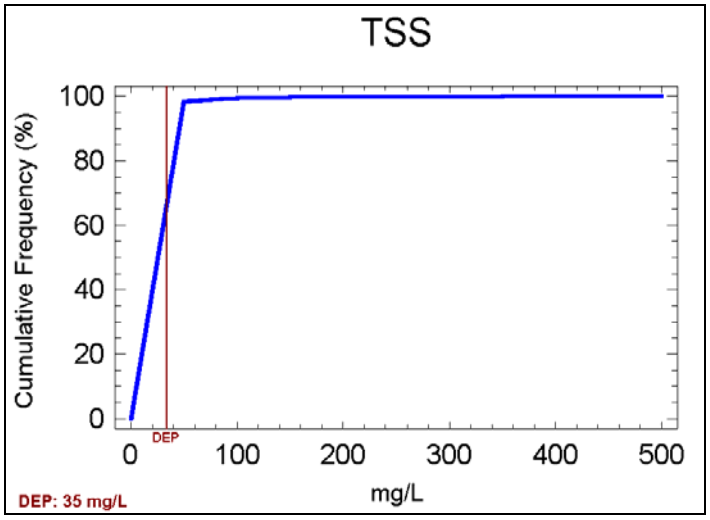


Figure F-61 Cumulative frequency curve for TSS, BMU 2

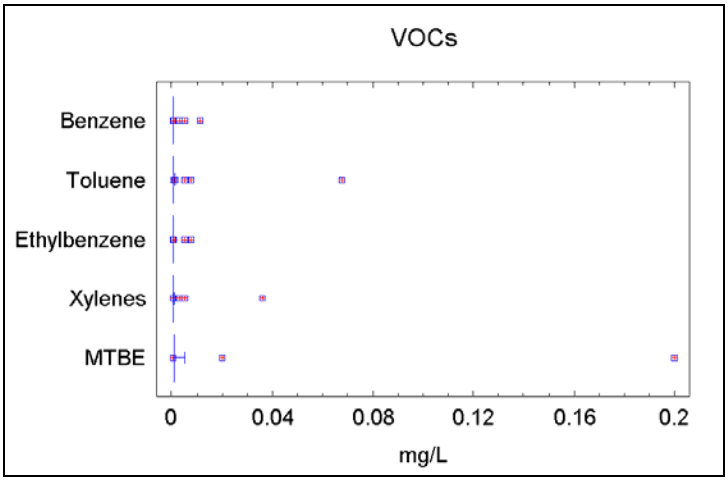


Figure F-62 Comparative boxplots of VOC measurements

BMU2: VOCS SUMMARY STATISTICS						
	BENZENE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**12/21/93**	**12/12/01**	**< 0.0005**	**0.0112**	**< 0.0005**	**< 0.0005**
BLUEGRASS (INNER & OUTER):	12/21/93	12/12/01	< 0.0005	0.0112	< 0.0005	< 0.0005
MISSISSIPPIAN PLATEAU:	02/04/97	11/07/01	< 0.0005	0.0009	< 0.0005	< 0.0005
EASTERN COAL FIELD:	03/29/99	05/30/00	< 0.0005	< 0.0005	< 0.0005	< 0.0005
OHIO RIVER ALLUVIUM:	10/08/96	10/03/01	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	TOLUENE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**12/21/93**	**12/12/01**	**< 0.0005**	**0.0677**	**< 0.0005**	**< 0.0005**
BLUEGRASS (INNER & OUTER):	12/21/93	12/12/01	< 0.0005	0.0677	< 0.0005	< 0.0005
MISSISSIPPIAN PLATEAU:	02/04/97	11/07/01	< 0.0005	0.0010	< 0.0005	< 0.0005
EASTERN COAL FIELD:	03/29/99	05/30/00	< 0.0005	< 0.0005	< 0.0005	< 0.0005
OHIO RIVER ALLUVIUM:	10/08/96	10/03/01	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	ETHYLBENZENE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**12/21/93**	**12/12/01**	**< 0.0005**	**0.0077**	**< 0.0005**	**< 0.0005**
BLUEGRASS (INNER & OUTER):	12/21/93	12/12/01	< 0.0005	0.0077	< 0.0005	< 0.0005
MISSISSIPPIAN PLATEAU:	02/04/97	11/07/01	< 0.0005	< 0.0005	< 0.0005	< 0.0005
EASTERN COAL FIELD:	03/29/99	05/30/00	< 0.0005	< 0.0005	< 0.0005	< 0.0005
OHIO RIVER ALLUVIUM:	10/08/96	10/03/01	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	XYLENE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**12/21/93**	**12/12/01**	**0.00049**	**0.03610**	**< 0.00050**	**< 0.00050**
BLUEGRASS (INNER & OUTER):	12/21/93	12/12/01	< 0.00050	0.03610	< 0.00050	< 0.00050
MISSISSIPPIAN PLATEAU:	07/09/97	11/07/01	< 0.00050	0.00072	< 0.00050	< 0.00050
EASTERN COAL FIELD:	03/29/99	05/30/00	< 0.00050	< 0.00050	< 0.00050	< 0.00050
OHIO RIVER ALLUVIUM:	03/23/99	10/03/01	< 0.00050	< 0.00050	< 0.00050	< 0.00050
	MTBE					
	START DATE	END DATE	MIN	MAX	MEDIAN	MODE
TOTAL:	**12/21/94**	**12/12/01**	**0.0004**	**< 0.2000**	**< 0.0010**	**< 0.0010**
BLUEGRASS (INNER & OUTER):	12/21/94	12/12/01	0.0004	< 0.2000	< 0.0010	< 0.0010
MISSISSIPPIAN PLATEAU:	04/19/00	11/07/01	< 0.0010	< 0.0010	< 0.0010	< 0.0010
EASTERN COAL FIELD:	03/29/99	05/30/00	< 0.0010	< 0.0200	< 0.0105	-
OHIO RIVER ALLUVIUM:	03/23/99	10/03/01	< 0.0010	< 0.0200	< 0.0010	< 0.0010

Table E-63 VOCs, Summary Statistics

BMU2: VOCs SUMMARY TABLE						
		BENZENE	TOLUENE	ETHYLBENZENE	XYLENE [1]	MTBE [2]
NUMBER OF SAMPLES	TOTAL:	92	92	92	86	81
BY REGION:	BLUEGRASS (INNER & OUTER):	37	37	37	34	31
	MISSISSIPPIAN PLATEAU:	29	29	29	27	25
	EASTERN COAL FIELD:	2	2	2	2	2
	OHIO RIVER ALLUVIUM:	24	24	24	23	23
NUMBER OF DETECTIONS	TOTAL:	4	6	3	4	1
	% DETECTS (vs SAMPLES):	4.35%	6.52%	3.26%	4.65%	1.23%
BY REGION:	BLUEGRASS (INNER & OUTER):	2	4	3	3	1
	MISSISSIPPIAN PLATEAU:	2	2	0	1	0
	EASTERN COAL FIELD:	0	0	0	0	0
	OHIO RIVER ALLUVIUM:	0	0	0	0	0
NUMBER OF SITES	TOTAL:	27	27	27	26	25
BY REGION:	BLUEGRASS (INNER & OUTER):	88	8	9	8	8
	MISSISSIPPIAN PLATEAU:	8	8	8	8	8
	EASTERN COAL FIELD:	2	2	2	2	2
	OHIO RIVER ALLUVIUM:	9	9	9	8	8
NUMBER OF SITES WITH DETECTIONS	TOTAL:	2	2	1	2	1
	% SITES W/DETECTIONS:	7.41%	7.41%	3.70%	7.69%	4.00%
BY REGION:	BLUEGRASS (INNER & OUTER):	1	1	1	1	1
	MISSISSIPPIAN PLATEAU:	1	1	0	1	0
	EASTERN COAL FIELD:	0	0	0	0	0
	OHIO RIVER ALLUVIUM:	0	0	0	0	0
NUMBER OF DETECTIONS ABOVE THE MCL	TOTAL:	1	0	0	0	0
	% DETECTIONS > MCL:	25.00%	0.00%	0.00%	0.00%	0.00%
	% SAMPLES > MCL:	0.28%	0.00%	0.00%	0.00%	0.00%
BY REGION:	BLUEGRASS (INNER & OUTER):	1	0	0	0	0
	MISSISSIPPIAN PLATEAU:	0	0	0	0	0
	EASTERN COAL FIELD:	0	0	0	0	0
	OHIO RIVER ALLUVIUM:	0	0	0	0	0

[1] 0003-9351 (W. Mason Well) - no samples analyzed for xylene

[2] MTBE first sample date is 12/21/94 (as compared to 12/21/93 for rest of VOCs)

	MCL (mg/L)
BENZENE	0.005
TOLUENE	1.000
ETHYLBENZENE	0.700
XYLENE	10.000
MTBE	0.050

Table E-64 VOCs, Samples Summary

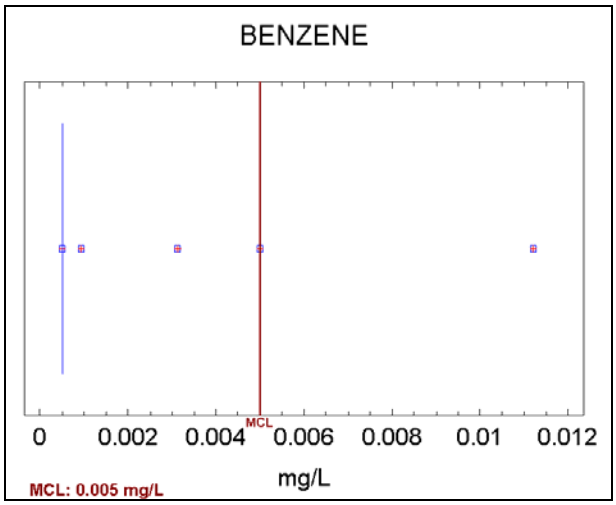


Figure F-65 Boxplot of benzene measurements, BMU 2

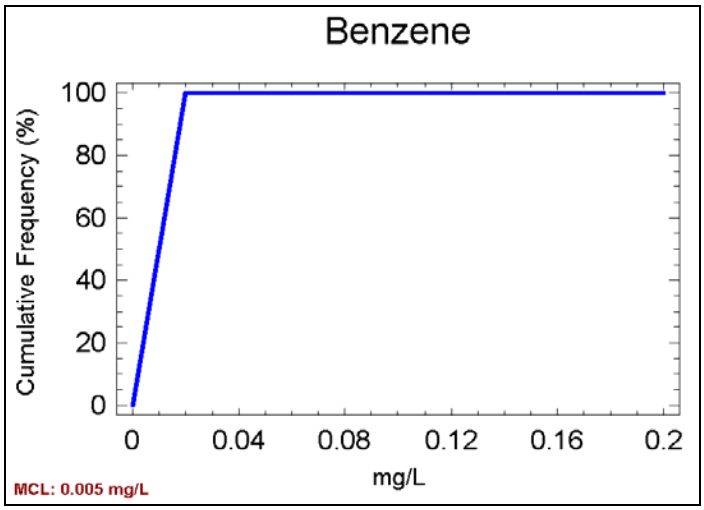


Figure F-66 Cumulative frequency curve for benzene, BMU 2

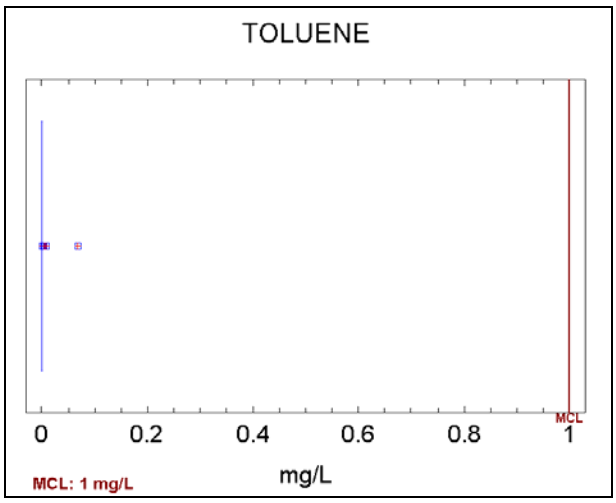


Figure F-67 Boxplot of toluene measurements, BMU 2

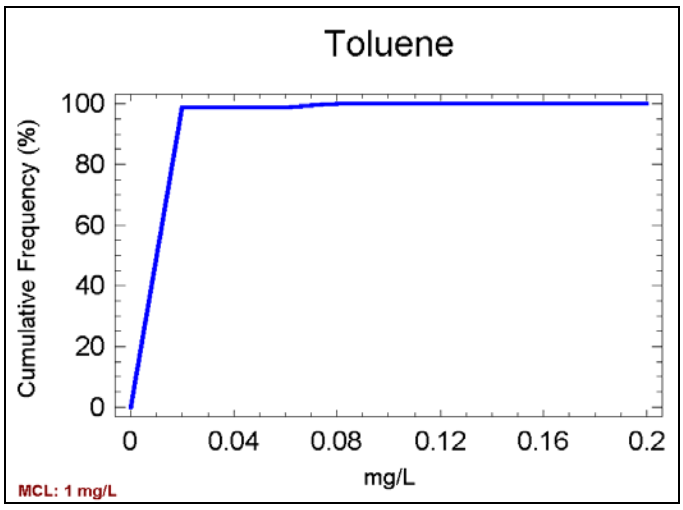


Figure F-68 Cumulative frequency curve for toluene, BMU 2

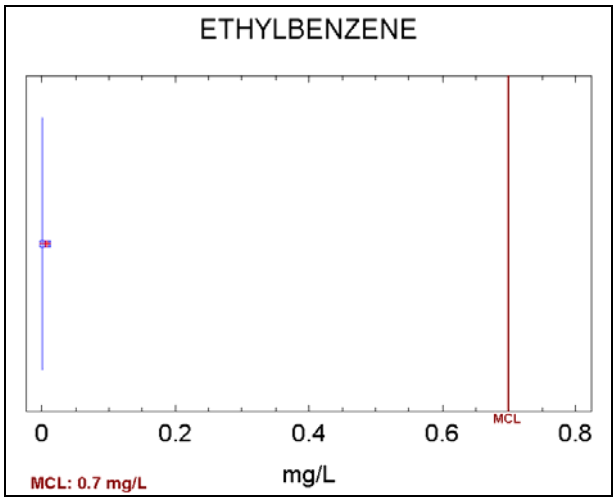


Figure F-69 Boxplot of ethylbenzene measurements, BMU 2

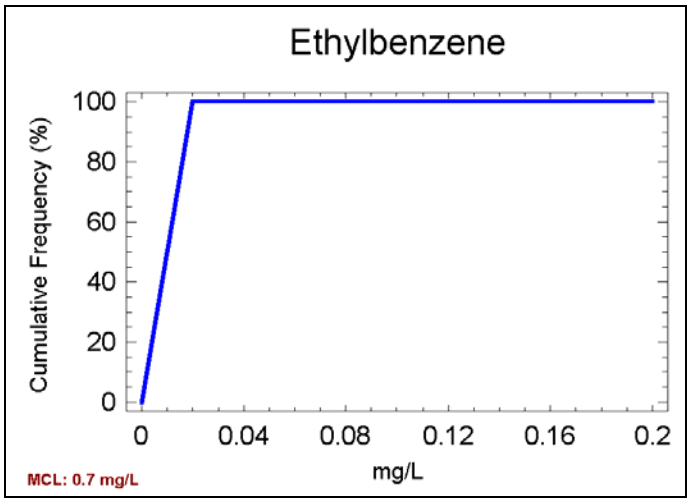


Figure F-70 Cumulative frequency curve for ethylbenzene, BMU 2

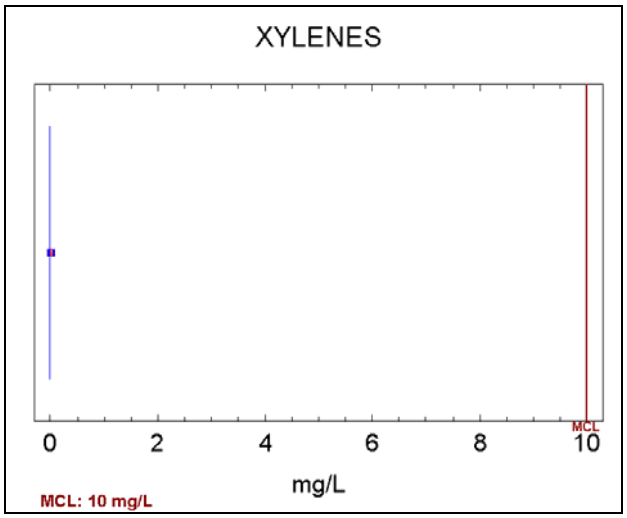


Figure F-71 Boxplot of xylenes measurements, BMU 2

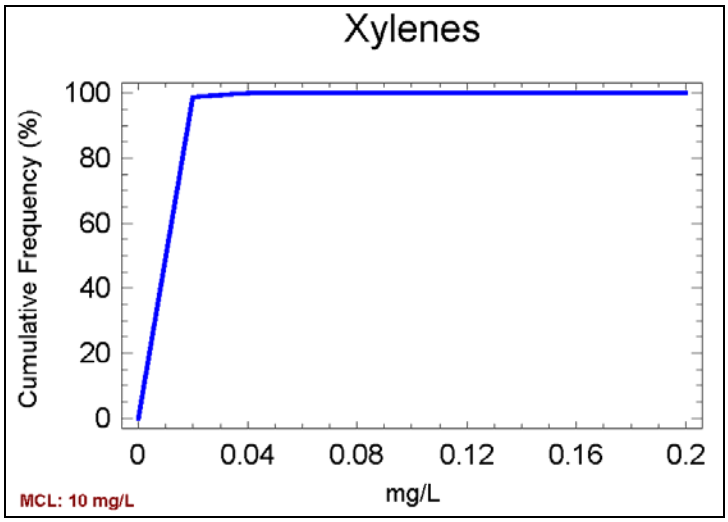


Figure F-72 Cumulative frequency curve for xylenes, BMU 2